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ABSTRACT

Volume 4 in a five-volume portfolio of studies reflecting different facets of the concept of education for rural development consists of three studies. The first study, "Planning for Meeting Manpower Requirements and Training for Self-Employment in Rural Areas," by Jose R. Vergara (Philippines), analyzes the scenario of growth and employment, economic policy and educational status of the country; provides steps in manpower planning and development of a suitable manpower program; and suggests training programs for self-employment (i.e., handicrafts and cottage industries, food production, broiler production/piggery, fishing, gardening/green revolution, sewing, distributive trades, and service trades). "Out-of-School Science and Technology for Rural Development," by A. M. Ghose (Malaysia), points out that in the developing countries of Asia, a shift from formal to non-formal education programs seems desirable. It presents several out-of-school science activities, showing how such activities could be linked to rural development or act as an important link between the rural communities and urban scientific institutions. "Education for Sustained Improvement of Technology in Rural Areas," by C. Prasad (India), is based on the Indian experience in respect to integrated rural development programs utilizing basically the philosophies, methods, and approaches of extension education. (AH)

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EDUCATION FOR RURAL DEVELOPMENT -A Portfolio of Studies

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Volume 4

Manpower, science and technology and extension education

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The portfolio on "Education for rural development" consists of five volumes:

Volume 1 – Education and the rural community

Volume 2 – Education for disadvantaged women

Volume 3 – Health and nutrition education

Volume 4 – Manpower, science and technology and extension education

Volume 5 – Inter-agency and inter-institutional co-operation

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PREFACE

The developing countries of the world today, particularly in the Asian region, are passing through a critical period. Most countries are faced with the problems of growing population, recurrent food shortages, illiteracy, malnutrition, environmental pollution and economic and social disparities. There is a big gap between those living in the urban and rural areas. The rural poor, who constitute the overwhelming majority of the population, are often neglected and deprived of the benefits to which they are entitled within their own societies. Thus the majority of them are malnourished and in poor health, illiterate or with a low level of education and with low income. The picture is even more gloomy with respect to women. This unhappy situation stems from a variety of factors, psychological, cultural, social, educational, economic and political.

The plight of these impoverished men and women has been felt by all the governments and several national and international agencies. Ways and means to solve the problems have been proposed and actions taken under various kinds of projects. There is a call for priority to be placed on agrarian reform and direct aid to the rural poor and for improvisation of simple low-cost technology to increase production and improve the processing of food and the living standards of the rural poor. Attempts have also been made to extend the services of government such as health and nutrition and education services and agricultural extension services. But in most cases these services do not reach the low income and deprived groups, either because they are not aware of the services available and do not know how to make use of the services or because of other socio-economic reasons.

In the area of education there has been a shift in priorities which entails more emphasis on distribution of educational services and equality of access to education. This change is prompted not only by humanitarian concerns, but also by important political and economic considerations. Dissatisfaction with the inability of the existing education system to cope with the problem of disparities has impelled the search for alternatives to formal education. Education for rural development as a new concept in education has been introduced. It is the kind of education which covers activities where educationists, community leaders and other groups are prepared to collaborate effectively with other agencies within a broadly-conceived multi-dimensional programme of rural transformation. The focus of the activities is on the development of rural communities. Education for rural development, i.e. education linked with the programme of rural development, is provided mainly through informal and non-formal modes, while at the same time linkages are established with the formal education system. The nature of the educational programme is dictated by the "total rural development" programme, its multi-agency character and multi-pronged approach to the problems. As seen in the countries in Asia, a non-formal educational programme includes a variety of aspects of education such as health and nutrition, agriculture, general education and skills development. In some countries science and technology education in the form of extension or out-of-school education is provided as an instrument for sustained improvement of technology in rural areas. Special programmes for women and deprived groups have

also been launched to remove the socio-economic disparities between men and women as also between the privileged and underprivileged sections of the two groups.

This portfolio is a compilation of studies which reflect different facets of the concept of education for rural development. The thrust is towards improving and transforming the economic and social life of the rural poor, where the basic human services are critically important – food, nutrition, health and education.

The publication is in five volumes, each of which is preceded by an introduction which gives the summary of the volume.

The first volume describes in brief the status of rural education in five countries, India, Indonesia, Nepal, Philippines, and the Republic of Korea. Problems in rural education in the countries and ways to solve such problems are also discussed.

In the second volume, experiences of two countries, India and Thailand, in the education of disadvantaged women are presented, showing how educational programmes are planned to minimize the disparities between the advantaged and disadvantaged groups.

The third volume deals with the problems of health and nutrition education in general, and the case study of the nutrition education programme in Indonesia and a study on research findings in health education in the Philippines in particular.

Volume 4 of the publication presents three studies on three aspects of rural development. The first is on manpower planning and training programmes for self-employment in rural areas. The second study discusses out-of-school science and technology for rural development, and provides examples of linkages between science activities and rural development. The third study is on extension education aiming at integrated rural development.

In the last volume of this publication, two studies on inter-agency and inter-instructional co-operation in rural development are presented, one by Pakistan and another by Thailand.

The Asian Centre of Educational Innovation for Development (ACEID) is grateful to the authors of the studies for their contributions to the preparation of this portfolio. It is published in the hope that it will be of help to teachers and administrators as well as those concerned with education in rural areas in their efforts to raise the social and economic status of the rural poor.

INTRODUCTION

Experience and studies have shown that a synchronized working of various components is important for rapid achievement of rural development. A strong political will on the part of the government, effective programme planning and implementation, use of appropriate technology, support of external resources and agencies and co-operation and participation of all types of institutions are some examples. There are many others which are important.

This volume consists of three studies which may be considered as important components of rural development. The first study presented by an educator from the Philippines is concerned with manpower planning and training for self-employment in rural areas. In the study, the scenario of growth and employment, economic policy and educational status of the country are analysed. Steps in manpower planning and development of a suitable manpower programme to relieve unemployment and under-employment in general are described. Training for self-employment in particular is viewed in terms of vocational preparation for the young and vocational training for adults. Suggested training programmes for self-employment include the following: 1) handicrafts and cottage industries, food production, broiler production/piggery, fishing, gardening/green revolution; 2) sewing; 3) distributive trades; and 4) service trades.

The second study is a Malaysian study on out-of-school science and technology for rural development. It has been pointed out in the study that in the developing countries of Asia, it will be necessary to shift the emphasis of education from the formal system to the non-formal sector. For symbiotic development of formal and non-formal science and technology education, it seems desirable to introduce elements of one stream into the other. There is a need to develop a large variety of out-of-school programmes to satisfy diverse types of developmental needs. The majority of out-of-school programmes for rural development, which emphasize heavily the economic productivity aspects of development, should give due consideration to other aspects involved in improving the quality of rural life. Out-of-school science and technology should be viewed as a practical realization of the oriental goal of education for fullness and development from within.

Several out-of-school science activities are presented in the study, showing how such activities could be linked to rural development or act as an important link between the rural communities and urban scientific institutions. These activities include science clubs, science camps, science fairs and science museums. Three types of extension services are also identified, i.e. the divided type, the consolidated type and the unified type. Some examples of successful agricultural programmes in Asia like the development programmes at Comilla, Bangladesh, and the training programme conducted by the International Rice Research Institute in the Philippines, are presented for consideration. Under non-formal science and technology education three projects are presented. The first one is an integrated project for general population, of which Project Comparison in the Philippines has been cited as an example. The Jombung Project in Indonesia is another example of a successful integrated rural development programme involving youth. The last type of integrated development project based on self-help is depicted by the Sarvodaya Project in Sri Lanka and the Saemaul Undong in the Republic of Korea. Two examples for the

education of women are given, one organized by the Academy of Rural Development, Comilla, Bangladesh, and the other by the Sri Lanka Mahila Samity, the National Women's Association of Sri Lanka.

The third study in this volume is mainly based on the Indian experience in respect to integrated rural development. In India, community development programmes utilize basically the philosophies, methods and approaches of extension education. The community development design is all-inclusive in its intent and objectives vis-a-vis agricultural extension, and emphasizes collective efforts by community people in resolving common problems. In this respect extension education becomes very important with a large role to play. It is education for sustained improvement of technology in rural areas. Its nature is to produce field-oriented extension agents. The extension workers themselves may comprise various professional categories such as researchers and subject-matter specialists in agriculture as well as in social sciences, who are to be suitably involved in the rural development programmes. A training centre for trainers should be established to produce qualified extension workers. To facilitate the achievement of rural development, youth development education both for boys and girls and also equal involvement of women in all sectors of development are imperative. The necessary supplies, supporting services and incentives are also needed. The infrastructure for these inputs and services must correspond in line with the extension programmes and activities. To accelerate the pace of rural development, support from the developed nations in terms of manpower and materials resources should be made available. The study provides some examples of training institutions, trainers' training centres and non-formal education programmes in extension education.

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PLANNING FOR MEETING MANPOWER REQUIREMENTS AND TRAINING FOR SELF-EMPLOYMENT IN RURAL AREAS

by

Jose R. Vergara*

INTRODUCTION

Reviews of the patterns and performance of over-all development in the Philippines show that despite the high GNP growth, expected benefits from this growth have not been widely shared. Moreover, the opportunity to earn a living has become elusive to a number of Filipinos.

The nature of the employment problem in the Philippines is not new – analysis of historical data dates back to more than 25 years ago.

The scenario of growth and employment

The Philippine population is one of the fastest growing in Asia. From 1948-1960, it grew at an annual rate of 3.1 per cent; from 1960-1970, growth was about 3.0 per cent; and in 1975, growth was estimated at 2.8 per cent. The high population growth in the Philippines is attributed to dramatic reductions in mortality and the high, though declining, fertility rate. The Philippine population is young – more than 40 per cent are below 15 years old. In fact, the 1903-1970 trend shows that the population is still getting younger. If fertility rate declines continue and an over-all life expectancy of 67.9 years is achieved, the total population will be 73.4 million by the year 2000. The estimated labour force for the same year is 21.1 million. The number of marriageable females will be larger and more and more people will survive to family and household-forming ages. Structural changes, however, will shorten (or already have shortened) economic-productive life – urban life in the 1970s has already manifested a shorter male Labour Force Participation Rate (LFPR). A growing number of female workers especially in the urban areas are entering or have re-entered the labour force. The youth and the elderly, on the other hand, were exhibiting lower LFPRs.

Over-all, the agricultural labour force grew at an annual rate of a little more than three per cent during the 50s but less than one per cent during the 1960s. The proportion of employed persons in agriculture decreased (60 per cent in the 1950s to 50 per cent in the 1970s). Male agricultural attachment increased from 43.8 hours a week (1964) to 44.6 hours (1972) as against the females' 33.9 hours from 30.4 hours a week. During the same period, the underemployed (those who wanted additional work) in agriculture declined from 50 per cent to 45 per cent for males, and from 17 per cent to 12 per cent for females; consequently industrial employment increased, from 21 per cent to 29 per cent for males and from 12 per cent to 15 per cent for females.

Manufacturing registered no consistent trend over the same period. Commerce, construction and transportation, though, registered moderate increases for both males

* Dr. Jose R. Vergara is Acting Director General of the National Manpower and Youth Council, and President of the Technological University of the Philippines.

and females. It is generally held that the country has had a favourable economic situation during the last few years and that females improved their position in the tertiary sector.

Estimates (1977) place employment in the following industries, by male (M) and female (F) as follows.

Manufacturing	(54.8% M, 45.2% F)
Commerce	(39.4% M, 60.6% F)
Construction	(98.6% M, 1.4% F)
Transportation	(95.0% M, 5.0% F)

The occupational structure of the labour force shows that professional, technical and related workers account for 11.5 per cent (1977) of females as against only 3.8 per cent of males. Conversely, a larger proportion of males than females is engaged in the categories of craftsmen, factory operatives and proprietors, managers, administrators and officials.

On the other hand, it is estimated that the unemployment rate is 4.5 per cent with more female workers than male workers among those unemployed. Of relevance in this regard is the fact that efforts to relieve open unemployment in the urban areas have created a vacuum (which is quickly filled by people from the rural areas) which in turn aggravates the unemployment situation in the cities.

Patterns of economic activity differ between urban and rural areas. A higher proportion of families derive their main incomes from wages and salaries in the urban areas in contrast to the proportion of families dependent on farming and entrepreneurial activities in the rural areas. In addition, income from landowners' share of crops, livestock and poultry raised by others, and income from gifts, assistance, support and relief compose a significant share of rural families' income, as opposed to the urban families' relatively stable earnings from paid employment. There also appears to be a wide gap between the rural poor and the urban rich (although in recent years attempts were made to narrow this gap). It is said that rural income distribution has worsened because increases in agricultural productivity were unequally spread among certain groups of persons and regions in the country. The distribution of income is seen to be very unequal, with the lowest 20 per cent of families receiving less than 5 per cent of total income.

Distribution of selected resources

The Philippines is a resource-rich country. In *fish production*, it produces on the average 1.5 million metric tons annually: municipal fisheries, some 945 thousand metric tons; commercial fisheries, some 455 thousand; and, inland fisheries, some 156 thousand metric tons. The *metallic mining industry* accounts for about P100-150 million (1972) of foreign exchange earnings (this certainly is more now considering the price of gold and copper) and it is estimated that the known reserves of principal metals (copper, nickel and gold) are sufficient to last until the year 2000. *Energy consumption* (mostly petroleum) is growing at an average annual rate of 8.5 per cent and is continuously increasing. If present trends continue, by the year 2000 total energy requirements will

reach 470.9 million barrels of FOE (fuel oil equivalent). Although data on actual *water supply* are wanting, the demand levels and rates of use indicate that the supply capacity of water is highly sufficient. About 33 per cent of this water supply potential, however, will be used to meet the needs of the population. *Forests*, which occupy 30 per cent of the total land area, will partially meet foreign demand for wood products. The domestic timber supply will be inadequate because the total area for timber production will not increase substantially. Already it is noted that one million hectares of denuded forests need reforestation for development into forest range land and some 3.6 million hectares for timber production purposes.

Technology

A factor in the growth of the agricultural sector is the increase in the irrigated area and intensity of land use. Technological changes, notably in the use of seeds and fertilizers, have offered substantial employment opportunities (and income) to great numbers in the country-side and have relieved some of the pressures for expansion of land holdings. However, some technology, especially that borrowed from abroad, has not been entirely efficient when applied to the Philippine setting. There is as yet limited evidence to show the effectiveness of given types of mechanization owing to the unusual diversity of the Philippines and the resource base (the labour-saving technologies currently being imported into the Philippines require large capital expenditures). The same observation also applies to technology choices employed in agricultural processing, with a few exceptions (the large-scale pineapple canning industry is one). At present, a growing need to develop technologies in fields other than agriculture is strongly felt and is now being given more serious consideration by the authorities. There are in the country today beginnings (the IRRI, the Technological University of the Philippines (TUP), the National Manpower and Youth Council's (NMYC's) industrial training centres, the technicians institutes, the polytechnic system, the Metals Industries Research and Development Center, the Institute of Small-Scale Industries of the University of the Philippines, and the National Science Development Board) of an extensive mechanism for the effective transfer of technological information and experience. Evaluation of these approaches, however, has been limited despite public acceptance of the performance of the IRRI, the TUP and the NMYC's regional training centers.

Education

Education in the Philippines is organized on a basic 6-4-4 structure representing the elementary, secondary and collegiate levels. The secondary is two-streamed: the academic stream brings the student into college and the vocational into a 3-year technical course or a 2-year stint in a school of arts and trades or into non-formal training institutions such as the NMYC. The public and the private sectors have collaborated in accommodating the school-age population. Elementary education is generally the government's responsibility whereas higher education has been supported and sustained by the private sector through tuition and other fees. Institutions of higher learning have tended to be concentrated in Manila. Although the distribution of graduates by field of specialization has been improving, the distribution has not been changing fast enough. Although many have shifted to fields where employment opportunities are better, a large number are still

in such popular courses as business and education. The rates of return to investment in higher education in the Philippines vary significantly, according to field of specialization and the institution attended.

Dropout rates are still high (industrial workers with no grade completed form 3.1 per cent of the total, and about 19.5 per cent have not completed elementary education).

In another view, the educational system has been producing graduates who have been only partly absorbed by the economy (the problem of the educated unemployed) or have been lost to countries with better employment opportunities (the question of exported manpower and brain drain).

The thrust in education has been changing since the 70s. The educational system is now progressively being re-oriented towards equalizing educational opportunities and promoting the socio-economic, cultural and political goals of the country. In the context of the Philippine Development Plan, education is now being programmed to be fully flexible and responsive to changes to "enable every Filipino to be more fully integrated with the nation's economic and social life".

In the future, young workers will be markedly better educated than ever before. Along with more education, the young workers will bring to the workplace higher occupational expectations, more innovative interests, higher mobility and more active participation in decision-making.

Wage policy

The Philippines has actively raised wage rates. While indeed this humanitarian approach to development has helped those who are working, there have also been some negative effects. Frequently noted are reports of lay-offs, retrenchments and shutdowns. These effects have caught the attention of labour authorities and policy-makers but the factors involved in the process have been left unnoticed.

In addition, the current structure of wages is not entirely without fault. Varied wage rates among skills have, in the words of some observers, "mispresented both relative supply and social productivity", and not only that, the wage-setting authorities appear to have been guilty of setting educational standards for positions and attaching salaries to justify the QES (qualification education standards). It is not uncommon to observe in the Philippine setting the lower salaries of fieldworkers (e.g. extension workers) who are often more productive, compared to those in the central offices.

Import substitution

Import substitution as an approach to development policy in the 1950s led to substantial industrial output. While this approach had some good effects in the beginning, it has failed to sustain employment as expected in later years. This strategy has not only accounted for significant factor price distortion but has resulted as well in raising costs of manufactured products to the users. The details of this approach were lengthily explored by the Ranis Mission and were judged in need of an immediate solution. What appears to be very important for the Philippines is for the rural sector to create activities that will provide rapid growth of employment and output. The lifting

of the constraints imposed on the further growth of the urban industrial sector, however, is seen as a companion to the development of the rural areas in order to create a balance between the two sectors.

The depressing effects of a related approach – government subsidy for the production of certain crops (e.g. rice) – have also been described as counterproductive to rural employment. It is reported that the subsidies on selected agricultural products have discouraged diversification of crops and further expansion of other cash products. Because of the low labour requirement of certain subsidized crops, aggregate demand for labour has been affected significantly.

The foregoing discussion fairly illustrates some of the things that must be considered in the task of improving the lot of the rural folk through certain development approaches.

Planning for meeting manpower requirements

Although planning has grown substantially over the years, little has been done to provide a system for planning which would promote more widespread development. Perhaps it is due to this deficiency that many constructive policies for rural development have been ruled out of consideration.

Widespread development requires a capacity to plan. Policies that may be established if this capacity is over-estimated may not succeed. On the other hand, if this capacity is under-estimated, feasible policies may not be given due importance.

Plans which do not pay explicit attention to manpower aspects are likely to be unrealistic in other respects. Although the plan's targets can be used as a source for manpower planning, they still need to be checked against other sources such as employers' estimates, or actual developments in other countries in comparable situations. In any case, plans cannot be just statements of what will happen in the future, but rather should be forecasts of what is likely to happen if the measures they propose are taken.

Some people tend to oversimplify the processes involved in manpower planning. Manpower planning is not a matter of just determining the number of workers that the economy/firm will need in various occupations for the next year or the next 5, 10, or 20 years and providing the educational and training facilities to produce that number. It goes beyond the determination of present and future manpower supply and demand. Planning for meeting manpower requirements includes taking enough lead time to bring supply and demand into balance; it means choosing the proper approaches for the distribution of workers among geographic areas, industries and occupations; it means taking measures to provide for the full utilization of the available manpower supply; and, it means providing facilities, teachers and instructors to educate and train workers.

Manpower inventory

As with all forms of planning, the main steps in manpower planning are defining needs, analysing trends and determining courses of action.

Thus, as a first factual base to manpower planning, a manpower inventory (collection of data) should be made to define the current manpower situation in relation to numbers, ages and location of workers currently employed. A manpower inventory, therefore, must include detailed analysis of individual skills and abilities. An accurate skills inventory will show what skills are immediately available, and conversely, what skills are not readily available. If the skill inventory is to provide an in-depth analysis of skills, it should obtain from each worker information on education and formal qualifications, work experience, and skills that can be put to use effectively.

Manpower audit

The second factual base to manpower planning is a systematic examination of the total manpower environment (manpower audit). The work here will call for detailed analysis of ratios and trends affecting the manpower resources situation. Such an analysis should include comparisons with earlier data to indicate trends and to explain the reasons for them. If one is to have some idea of the shape, size and constitution of future manpower resources, one must base forecasts on the extrapolation of the past and the present into the future. In other words, the typical questions for which answers will be sought in a manpower audit are:

1. What number and types of skills were employed in the past and now?
2. What is the trend of employment? Is it up, down or steady?
3. What are the trends in the labour market for the skills needed?
4. How much would the training cost be in terms of money, time and effort?

Making estimates of manpower needed to meet projected output levels is not an easy job. The difficulty derives from, as mentioned earlier, the time span to be considered and the relationships of the output and skills requirements. As everyone knows, there are frequent changes in the mix of skills due to labour turnover. It is a *must*, therefore, for manpower planners to identify such factors as inputs to and outflows from the firm whose future manpower requirements one is trying to forecast. For a particular skill category, the input factors are:

1. Recruitment from the firm;
2. Lateral transfers into the skill category within the firms; and
3. Vertical transfers after training or apprenticeship.

On the other hand, the outflows factors are:

1. Lateral and vertical transfers to other locations and to other skill categories; and
2. Wastage (due to resignation, death, retirement, lay-off).

Once units of the forecasts are defined (e.g. occupational groups and economic

sectors) calculation can begin. It should be noted, however, that calculations of this kind will not be exact predictions of the future.

Some aids to determining manpower requirements

Two basic methods are used in forecasting: (1) extrapolation of past national experience and (2) international comparison. While in practice permutations of the two methods are used, extrapolation has been widely used in France, Great Britain, the United States, and in selected Mediterranean countries. On the other hand, international comparison has been popularly used in Thailand, Puerto Rico, Spain and the United Arab Republic.

National experience and international comparison are indeed important aids in determining manpower requirements. In the Philippines, attempts at determining manpower requirements were made as early as the mid-60s. Although these attempts provided no explicit targets for the reduction or elimination of underemployment and unemployment, they have laid the basis for estimating manpower requirements by selected occupations (for instance, incremental requirements for various occupations were calculated on the basis of average yearly growth rates; in the case of teachers and professors, for example, requirements were calculated from the projections of enrolment by means of teacher-student ratios).

While much work (especially in population estimation) has been done using international comparison, manpower requirement estimations on the basis of international comparison have been limited by wide differences in concepts, definitions, methods of collection and the like. At any rate, planners in this country have proceeded with caution (it is common to note, in practice, judicious adjustments made in data derived from national surveys or lifted from international statistical bulletins) in their use of either or both of these manpower aids.

No matter what methods are used in forecasting, the important thing to note is that they provide means of predicting the future with some sense of surety. Only by painstaking examination of past and present trends and vigilant monitoring of these trends, however, can the manpower planner expect to determine *how*, in *what* areas and *when* manpower programmes need to be adjusted in order to produce the number required to meet manpower needs.

Development of a suitable manpower programme

The necessary decision to take after future manpower requirements have been established is to develop a balanced manpower programme (this can come in 3 phases: long, medium and short-term) that should include, among other things (recruitment, distribution, stabilization) the following:

1. Education;
2. Training;
3. Motivation; and
4. Utilization.

Manpower, science and technology and extension education

In confronting the aspect of education, it is best to remember that although education should be geared to the occupational needs of the country, it also has a broader purpose – that of social, economic, political and cultural development.

At any rate, the critical areas which should be considered under education are:

1. The expenditure on education as a percentage of gross national product (GNP);
2. The allocation for elementary, secondary and higher education (including general and vocational education);
3. The need for expansion of facilities and increases in numbers of teachers and instructors;
4. The revision of course content (e.g. between humanities and sciences); and
5. The changes/adaptation in teaching methods and procedures.

Thus, in the context of planning balanced manpower programmes, it is important to remember that the balance among elementary, secondary and higher education, between general and vocational education, and between humanities and the sciences must be in such proportions so as to help rather than deter economic development. Rough estimates of some experts in educational planning place budgetary proportions which can serve as effective guidelines, as follows: 35 per cent for elementary; 40 per cent for secondary, and 25 per cent for higher education.

Under training, the concern of manpower planners is the consideration of methods of training that: (1) are complementary to or supportive of formal training institutions; (2) can provide the required manpower immediately; and (3) can employ existing facilities and programmes for the training of top, middle-level management and supervisory personnel to meet present and future needs of the expanding economy.

Methods of training of this kind should:

1. Assure that the programmes being planned either as part or outside of the formal training system will produce the required numbers on a co-operative rather than on a competitive basis;
2. Assure that existing training facilities will be used to the maximum extent for the training of out-of-school youth and unemployed adults; and
3. Assure that existing training programmes in industry to meet the need for more effective management and supervisory personnel will be encouraged.

The general trend in training in the country today reflects the points presented above. This is not to say, however, that in practice the monitoring and co-operation of training programmes of various departments in the government and in the private sector is clear-cut and not a tedious job.

In the 1970s considerable work was done on the question of the capability of the vocational/technical training system to effectively meet future demands for skilled workers. This work included the evaluation of vocational/technical education in 1970,

a study of the apprenticeship programme, creation of the NMYC, re-structuring of the whole educational system, creation of the technical institutes, and the latest review of vocational/technical education in the country. It is apparent that the combined result of the work of the National Manpower and Youth Council, the Technological University of the Philippines, the Technician Institutes, the Institutes of Science and Technology, the Industry Boards and the private employers will develop into a really effective instrument for meeting future demands for skilled workers, technicians and instructors.

Under motivation, consideration should centre on various forms of incentives to prospective workers and discouraged workers. Actions in the this regard should be directed to: (1) change in attitudes (in particular, change in work attitudes); (2) monetary rewards; and (3) policy issues.

Consequently, the role of each of the following will have to be underscored in enhancing the effectiveness of development programmes:

1. The efforts to change values should begin in the *schools;* curricula should concentrate on various occupations or skills which could speed up individual growth, develop employability of the individual and increase earnings;

2. Campaigns by *mass media* which should direct attention to occupations or careers suitable to individuals, given their aptitudes and capabilities;

3. Recognition of accomplishment and performance through *incentives* by both government and employers: public recognition/emulation, monetary awards, extra pay and bonuses; and

4. The steps taken by governments in enhancing or deterring training programmes through *policy issues* such as education and training policies, industrial incentives, industrial strategies and wages and the steps taken by policy-makers in containing the outflow of high-level and skilled workers.

The long-term problem of re-orienting attitudes is a slow process. This is due to a number of factors, one of them being the status attached to some occupations. In addition, although recently the demand for skilled labour abroad has magnified the growing importance of some skilled occupations, this demand has not changed the present wage rates of skilled workers who remain in the country.

In the Philippine setting, it is popular to give rewards to individuals for work well done or for work beyond required quotas, or for training employees in the case of industry. Among the incentives given recently by the government to private firms is the deduction, under the training incentive scheme (TIS), which can go up to 50 per cent of taxable income, provided that the deduction does not exceed 10 per cent of the direct labour wage.

In the matter of manpower export, steps are being taken by NMYC to develop skilled workers to replace (this includes skill certification) those who left and skills upgrading for those who remain in the industries. It should be mentioned at this point that graduates of the Batarisan Program (an in-plant training program utilizing out-of-school-youth (OSY) could well be the country's cadre of reserves.

Manpower, science and technology and extension education

Policies play an important role in enhancing or deterring development programmes. In the case of the Philippines, many policies on taxes, credit, subsidies and even on employment have tended to be regressive instead of progressive, to the detriment of the economy.

In the mid-70s, however, there was a change from a policy of import substitution to one of export promotion. With the creation of the Commission on Small-Scale industries in the Ministry of Industry, a policy to move industries to the rural areas was implemented for the first time.

At present, it is quite clear that necessary fiscal reforms could be effected by the government. Already a number of tax and tariff measures have been enacted which could lead to increased revenues for infrastructure in the rural areas and other purposes.

The emphasis on expenditure on rural infrastructure is expected to increase the productivity of low-income families in the country-side. In addition, loan programmes of many government departments are expected to provide increased earning opportunities. Furthermore, the extension delivery system is envisioned to accelerate and sustain technology transfer, reduce rural unemployment and upgrade quality of life in the countryside.

In considering programmes to relieve unemployment and under-employment in rural areas, the concern of planners would be:

1. The identification of areas where these exist and the means for the full utilization of those portions of the labour force;

2. The study of factors (including plant capacities and organization) that would increase worker productivity; and

3. The consideration of means for providing sufficient pools of high level, middle-level and skilled workers (this applies mainly to the role that private industry may take to supplement government efforts).

Having the above as a frame of reference, the planners of manpower programmes would be invited to pay attention to what extent the government and the private sector could contribute to: (1) the improvement of the lot of the unemployed and the under-employed especially in the rural areas where these groups predominate, including the development of their competencies in certain types of livelihood or crafts in the provinces or villages; (2) studies that would determine the extent and the relationship between productivity and plant organization, management techniques and other factors that may cause variation between firms even in the same industry; and (3) the development of workers during employment through skills upgrading and in-service training.

It must be emphasized here, however, that for significant practical effect, development planning should have bearing on rural communities. It is true that while the desire for development is great among rural communities, the rural people are usually technically unprepared and uninformed. Devolution of planning from the central planning body to the rural development communities requires involvement of rural institutions and

individuals, e.g. government services (including the village structure), credit institutions, co-operatives and even labour unions.

In particular, it is in the rural areas that such problems as underemployment and low productivity are most pronounced. Thus, even if infrastructure (say schools, roads, power, irrigation, extension services), appropriate technology and modified fiscal and employment policies were provided, corresponding efforts at training of individuals for productive self-employment should still be ensured.

Training for self-employment in rural areas

Although in rural areas opportunities for earning a living are limited by the availability of land and infrastructure, it is here that most of the rural folk will find long-term employment.

How then can the unemployed youth and adults in these areas benefit from planned development programmes? Surely the answer to this question is not easy to come by and could well depend on the needs and abilities of individuals.

The needs of the young are associated with vocational preparation and could be one or all of the following:

1. Knowledge of occupations;
2. Knowledge of the environment; and
3. Knowledge of history, geography, nutrition, civics, and cultural activities and the like.

Adult needs are associated with vocational training and are characterized by:

1. Better adaptation to the environment or community, or to the occupation that he plans to follow; and
2. Acquisition of trade skills, techniques and competencies.

In this context, training for gainful self-employment in rural areas can be pursued at two levels: first, in rural vocational preparation which is two-streamed, one stream leading back to school and another to further vocational training; and second, in vocational training in skills training centres.

At the NMYC, vocational preparation consists of training in literacy, numeracy, and general value-reorientation, along with such simple skills as Practical Arts, Agricultural and Food Production, Industrial Trades and Cottage Industries. Vocational guidance also forms part of the training schedule. This includes information on the labour market and other related information.

On the other hand, vocational training in NMYC's training centres offers training in basic skills such as automotive, electricity, electronics, machine shop, welding, handtool fabrication, cereal production and carpentry; also offered is skill upgrading in auto engine repair, domestic electricity, sheetmetal, and agromechanics. To further equip young

adults (generally aged 17-24) who train at the centres or under the auspices of employers (e.g. the Batarisan Program) or in other off-training centres, such courses as building trades, agribusiness, construction trades, village technology, food production/processing and preservation, and entrepreneurship are provided.

But over and above equipping young workers and adults with skills needed for the exercise of their calling, would be the education of these prospective workers about the services and technologies that are available or may be made available to them.

Also of relevance in this regard would be the study of employment generating programmes in terms of cost and profitability since programmes of this kind entail financing.

To return to self-employment, the following training programmes can be considered:

1. Handicrafts and cottage industries, food production, broiler production/ piggery, fishing, gardening/green revolution;
2. Sewing;
3. Distributive trades such as vending, small retail store management; and
4. Service trades such as repair of electrical household appliances.

As regards the training itself, every training programme should pay attention to these aspects, namely: (1) the level of the trainees the programme is addressed to; (2) the familiarity of the instructors with the subject matter, including use of demonstration or simple mathematics; (3) the curricula; (4) availability of raw materials; and (5) relationship to the main rural occupations and various kinds of rural institutions.

Concluding remarks

If rural areas are to minimize unemployment and experience higher productivity, their abundant resources should be harnessed to the maximum extent. Most important of these resources are the unemployed young people who, if left alone without provision for their productive integration into the world of work, will become burdens to their communities. The contribution of this important segment of society , however, rests on how best the group can be utilized, given the available manpower base, infrastructures, technology, raw materials and instructors. In addition, coming to grips with the issue of unemployment in rural areas brings to the fore the need for a mixed bag of rural employment policies that can ensure increased employment opportunities in the countryside.

There is a need to realign strategies so that while expanding low-growth areas and improving the material well-being of the benefactors of that growth, complementary actions on factors that have causal attributes (progressive or regressive) are attended to. The training of manpower to fill new requirements appears to require a built-in flexibility on the part of the authorities concerned, to meet contingencies brought about by shortages, inadequacies or limited resources.

In the case of the majority of the rural folk who are described as lacking in education and technical know-how and under-informed, and in the case of the rural areas,

where scarcities rather than abundance predominate, some principles to observe, as recommended by the ILO, are as follows:

1. *The principle of power.* Here the concerned parties are recommended to closely follow up their goals of training for self-sufficiency and to deploy the resources available or which may be made available in time;

2. *The principle of security.* Here the action to be taken falls within the realm of strategic planning to meet contingencies; and

3. *The principle of economy of means* whereby organizations in training and training facilities are recommended to be fully utilized. The importance of this principle lies in the reduction of duplication of efforts which leads to the depletion of already scarce resources.

Development efforts for the next decade in the Philippines will principally be directed towards the solution of the age-old problem of unemployment and underemployment. The direction that the authorities are taking is demonstrated by the five thrusts of the Development Plan as follows:

1. Quality improvement of education and manpower development and management;

2. Development of manpower for farming, fishery, animal science, and forestry to lift the standard of living in the rural areas;

3. Development of manpower needed for industrialization;

4. Provision of the resources needed to support education programmes, including larger financial assistance for education and training agencies in both public and private sectors; scholarships and grants for poor but deserving students; and incentives for deserving institutions; and

5. Development of culture, sports and physical fitness, and the media.

PROJECTED LABOUR FORCE 15 YEARS OLD AND OVER BY SEX: 1970-2000

(Medium Assumption)

Year	*Total*	*Male*	*Female*
1970	12,260,398	8,166,220	4,094,178
1975	14,834,948	9,757,002	5,077,946
1980	17,790,138	11,612,174	6,177,964
1985	21,052,894	13,654,804	7,398,090
1990	24,623,431	15,882,827	8,740,604
1995	28,690,768	18,382,289	10,308,479
2000	33,322,641	21,177,612	12,145,029

Source: Labor Force Projections by Age and Sex for the Philippines: 1970-2000, UNFPA-NCSO Population Research Project.

AVERAGE HOURS WORKED PER WEEK BY MAJOR INDUSTRY GROUP, BY SEX: 1964 and 1972

Major Industry Group	*1964*			*1972*		
	Total	*Male*	*Female*	*Total*	*Male*	*Female*
TOTAL	*42.4*	*45.0*	*37.3*	*44.7*	*45.9*	*42.3*
Agriculture, fishery and forestry	40.7	43.8	30.4	42.4	44.6	33.9
Mining and quarrying	48.0	48.0	*	50.6	49.1	*
Manufacturing	39.7	46.5	34.9	44.2	47.8	39.7
Electricity, gas and water	45.0	44.9	*	44.8	45.0	*
Construction	45.7	45.8	*	46.1	46.1	*
Commerce	44.4	48.1	42.0	47.1	47.9	46.6
Transportation, storage and communications	49.0	49.1	*	50.4	50.5	48.1
Government, community, business and recreational services	46.2	47.5	42.2	45.5	46.7	43.9
Domestic services	59.5	54.9	60.4	56.0	52.0	56.6
Personal services other than domestic	42.0	46.4	38.8	47.7	49.4	45.6
Industry not reported	35.6	41.2	*	*	*	*

Source: Labor Force Bulletin, May, 1964 and August, 1972.

* Average is not computed when the total is less than 9,500.

EMPLOYED PERSONS BY MAJOR INDUSTRY GROUP AND BY SEX: THIRD QUARTER, 1977

Major industry group	*TOTAL*		*MALE*		*FEMALE*	
	Number	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*
TOTAL	*14,334*	*100.0*	*9,890*	*69.0*	*4,444*	*31.0*
Agriculture, fishery and forestry	7,474	100.0	5,978	80.0	1,495	20.0
Mining and quarrying	52	100.0	50	96.2	2	3.8
Manufacturing	1,515	100.0	830	54.8	685	45.2
Electricity, gas and water	42	100.0	39	92.9	3	7.1
Construction	484	100.0	477	98.6	7	1.4
Commerce	1,355	100.0	534	39.4	821	60.6
Transportation, storage and communications	681	100.0	647	95.0	34	5.0
Financing, insurance, real estate and business services	338	100.0	220	65.1	119	35.2
Community, social and personal services	2,298	100.0	1,051	45.7	1,247	54.3
Industry not adequately defined or not reported	96	100.0	63	65.6	33	34.4

Source: Integrated Survey of Households, Third Quarter, 1977.

EMPLOYED PERSONS BY MAJOR OCCUPATION GROUP AND BY SEX: THIRD QUARTER, 1977

Major Occupation Group	*TOTAL*		*MALE*		*FEMALE*	
	Number	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*
TOTAL	*14,334*	*100.0*	*9,890*	*100.0*	*4,444*	*100.0*
Professional, technical and related workers	888	6.2	377	3.8	512	11.5
Administrative, executive and managerial workers	106	0.7	89	0.9	17	0.4
Clerical workers	650	4.5	363	3.7	286	6.4
Sales workers	1,372	9.6	543	5.5	829	18.7
Service workers	1,094	7.6	454	4.6	640	14.4
Agricultural, animal husbandry, and forestry workers, fisherman and hunters	7,429	51.8	5,934	60.0	1,494	33.6
Production and related workers, transport equipment operators and labour	2,747	19.2	2,103	21.3	644	14.5
Occupation Not Reported	48	0.3	26	0.3	22	0.5

Source: Integrated survey of households, Third Quarter, 1977.

UNEMPLOYMENT RATE BY SEX: THIRD QUARTER 1977

Sex	*Labour Force*	*Unemployed*	*Unemployment Rate*
TOTAL	15,002	668	4.5
Male	10,173	283	2.8
Female	4,830	386	8.0

Source: Integrated Survey of Households, Third Quarter, 1977.

EMPLOYED PERSONS BY EDUCATIONAL ATTAINMENT AND BY CLASS OF WORKER: THIRD QUARTER 1977

Educational Attainment	*Total*		*CLASS OF WORKER*							
			Wage & Salary Workers		*Self-Employed*		*Unpaid Family Workers*		*Not Reported*	
	Number	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*
TOTAL	*14,334*	*100.0*	*6,545*	*100.0*	*5,484*	*100.0*	*2,273*	*100.0*	*33*	*100.0*
No grade completed	983	6.9	205	3.1	604	11.0	170	7.5	4	12.1
Elementary	*7,698*	*53.7*	*2,651*	*40.5*	*3,559*	*64.9*	*1,471*	*64.7*	*17*	*51.5*
Grade 1-5	4,231	29.5	1,276	19.5	2,146	39.1	798	35.1	11	33.3
Graduate	3,467	24.2	1,375	21.0	1,413	25.8	673	29.6	6	18.2
High School	*3,277*	*22.9*	*1,773*	*27.1*	*979*	*17.9*	*517*	*22.7*	*8*	*24.2*
1st-3rd Year	1,663	11.6	805	12.3	537	9.8	316	13.9	5	15.2
Graduate	1,614	11.3	968	14.8	442	8.1	201	8.8	3	9.1
College	*2,291*	*16.0*	*1,862*	*28.4*	*319*	*5.8*	*106*	*4.7*	*4*	*12.1*
Undergraudate	1,024	7.1	738	11.3	200	3.6	84	3.7	3	9.1
Graduate	1,267	8.8	1,124	17.2	119	2.2	22	1.0	1	3.0
Not reported	85	0.6	54	0.8	23	0.4	8	0.4	–	–

Source: Integrated Survey of Households, NCSO, Third Quarter, 1977.

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OUT-OF-SCHOOL SCIENCE AND TECHNOLOGY FOR RURAL DEVELOPMENT

by

A.M. Ghose*

Case for out-of-school education

During the last couple of decades needs, priorities as well as strategies for national development have changed drastically in the Third World countries. A number of countries in the Asian region gained political independence shortly after the termination of the Second World War and immediately thereafter many of them launched development programmes which gave priority to the establishment of institutions and instruments of economic growth which have played important roles in the industrialization of the developed societies. This instrumentalist model of development was, in general, heavily urban-biased and often inimical or at best indifferent to rural societies. It was hopefully assumed that the benefits of industrialization would somehow percolate down to the underdeveloped and undeveloped strata of the society as the economy moved towards take-off; but this hope was mostly unrealized. With the passage of time, instead of the establishment of a New Economic Order, the gap between the poorer and the richer nations has widened, the fortunate few in the cities have flourished at the expense of increasingly larger numbers of the rural poor and even within the same community social and economic disparities have increased alarmingly.

In the instrumentalist model formal education was expected to perform at least two vital tasks. It was to promote social changes necessary to transform the undeveloped society to an industrial one and at the same time to provide the trained skilled manpower which is a pre-requisite for this economic transformation. Unfortunately, formal education in most of the newly independent Third World countries was based, by and large, on the urban-based and urban-biased systems which were first established by colonial rulers to serve their narrow ends. It is not surpising, therefore, that in many countries formal education was found inadequate to meet the challenges of national development in general and rural development in particular.

The unsatisfactory performance of the instrumentalist model emphasized the need for reappraisal of the development process as a whole. In recent times new strategies for development have been evolved, based on critical examinations and analyses conducted by concerned social scientists, scientists and technologists, politicians, educationists and others interested in the phenomenon of development. It is now recognized that far from being linear, development has many dimensions: social, political, human and others, apart from its economic dimension. It was also realized that these dimensions are strongly interlinked so that all effective development programmes must adopt a holistic approach in their implementation strategy, in which education forms an indispensable component. It is to be noted, however, that formal education alone would not be adequate

* Professor A.M. Ghose is a staff member of the School of Physics, Universiti Sains Malaysia, Penang, Malaysia.

for developmental purposes and it is necessary to generalize and diversify educational approaches to include out-of-school education.

Formal education is an unsatisfactory tool for rural development for a variety of reasons. In many cases the curriculum is unsuited for the predominantly agricultural society. It is very often irrelevant to the needs and aspirations of the rural population. Formal education is usually bookish in nature and it often tends to alienate young people from the land. It is also very frequently an inefficient system with a large number of dropouts, especially in rural areas. Again, it is basically derived from an external form of schooling infused with foreign culture and has quite often proved detrimental to the development of indigenous economic institutions. Formal education, in many instances, is dominated by humanities and liberal arts oriented subjects at the expense of agricultural and technological disciplines necessary for the growth of the skilled manpower essential for development. Furthermore, even in the countries of the Third World which have been successful in developing formal education systems free from many of the above mentioned defects, limitations of human and economic resources do not allow the benefits of formal education to be extended to everyone in the growing school age population.

In the present article we shall examine briefly some of the different types of out-of-school education programmes in the Asian region which have made significant contributions to rural development. Because of their relative importance we shall be primarily interested in the science and technological components of the programmes. Before proceeding further we must emphasize that formal education has also its own area of relevance in developmental strategy. For example, transfer of sophisticated technology and advanced scientific research requires the services of scientists and engineers who have been trained through formal educational channels. In the present article we shall, therefore, adopt the viewpoint that development requires symbolic growth of both formal and out-of-school streams of education, although at the same time it is recognized that the former, in general, lacks the flexibility, diversity and adaptibility of the latter to respond to varying types of developmental needs.

Classification of out-of-school activities

The most general concept of education, which is now almost universally accepted, equates education with learning, no matter how, where and when learning occurs. In accordance with this concept, out-of-school education is to be identified with all learning activities which take place outside the institutionalized, chronologically graded and hierarchically structured formal educational system. Thus an activity is to be considered "out-of-school" even though it takes place within the school framework, if it is carried out outside the formal teaching periods and the formal curriculum.

Out-of-school education has often been subdivided into informal and non-formal education. This division is rather arbitrary and there are many overlapping areas between the two subsystems so that the same activity has been sometimes classified as informal and at other times as non-formal. Very qualitatively speaking, informal education includes out-of-school learning activities which are less organized and often unsystematic compared to those categorized as non-formal education. In short, the classification is

relative rather than absolute although in many cases it is possible to classify a given activity in one of the groups unambiguously. Thus learning acquired by reading newspapers or listening to radio and TV programmes may in most cases be considered informal. On the other hand, agricultural extension programmes, adult literacy programmes, and vocational training impart non-formal education. Again, the activities carried out in science clubs will be classified as informal or non-formal depending on their degree of organization and systematization. To avoid possible ambiguities which may arise if we adopt this classification in this report we shall group together those activities which resemble each other either in their objectives or in their educational contents or else have organizational similarity.

Role of science clubs and science camps in rural development

Science clubs, which have been defined as voluntary associations of persons interested in the promotion of some aspects of science and technology through experimentation, observation, and discussion, now form an important component of the educational system of almost all countries in Asia. When science clubs were first established in significant numbers in these countries approximately a quarter of a century ago, many educationists viewed them as imported luxuries. In several instances this criticism was at least partially valid since during those early years many science clubs were mere copies of their counterparts in the West and had no relevance to the realities of the situation in developing countries. In the same period, at least one country in Asia launched an extensive programme for establishing science clubs in rural regions of the country. In the planning of this programme it was implicity assumed that within a reasonable period rural development would occur at a pace rapid enough to generate the proper local environment to nurture the programme. Unfortunately, in a large number of cases formally educated staff appointed to run these science clubs followed the migratory pattern of educated youth in rural areas and opted for more lucrative jobs in the cities. Many of the activities planned in these science clubs were either not carried out due to lack of personnel or were not interesting enough or relevant to the rural communities concerned. From the failure of the project to take off several important lessons were learned. Unless an externally imposed programme is designed carefully to respond to the needs and priorities of its clientele, the chance of its survival especially in rural areas is very slim. Before launching any large scale programme it would be more appropriate to sensitize and to bring awareness to the community through small-scale preliminary programmes, which are preferably developed locally, utilizing local talents, who may or may not possess high academic qualifications. The period of time required before a programme becomes viable may be quite different when viewed at the implementation level than at the planning level. In developing countries it would not be appropriate to assume that the forces of development will sustain an educational programme; quite on the contrary, it would be more correct to assume that properly designed educational programmes would act as agents of socio-economic transformation.

In the sixties a significant trend began to emerge in the planning of objectives, contents and implementation of science club activities. During this period national institutions of education were established in many Asian countries and almost all of them included promotion of extra-curricular activities within their programmes of action. Hitherto science clubs were almost exclusively attached to schools for extramural activi-

ties of the students. Science clubs organized outside the school as well as science clubs organized in rural areas by the members of the rural communities themselves began to appear on the educational scene. National bodies for co-ordinating out-of-school science eduation (limited mainly to science clubs and allied activities) were established in some Asian countries. On the international scene, Unesco helped the foundation of a non-governmental international organization with consultative status with Unesco, entitled the International Co-ordinating Committee for the Presentation of Science and Development of Out-of-school Scientific Activities (I.C.C., in brief). The trend observed in this field was increased involvement with the community, greater coherence in programmes, and an increased degree of systematization in planning and implementation, leading to the transition from informal to non-formal science education.

In the Philippines science clubs are co-ordinated by the Science Foundation of the Philipines (SFP), which conducts an elaborate programme of out-of-school science activities on the national scale. One of its projects is concerned with the analysis and resolution of community problems through out-of-school science education laboratories (OSSEL). Under this programme science club members undertake investigatory projects in natural sciences using the natural environment of the community. The projects are planned in such a way that they can be sustained by using locally available resources. In an OSSEL located in a *barangay* (village), for example, projects are mainly agricultural in nature. Typical projects involve investigations of vegetable crop production, production of vinegar, utilization of agricultural waste materials, improvement of agricultural and non-agricultural cottage industries, studies on applied nutrition, establishment of vegetable seed banks, investigations of medicinal plants, studying differential yeilds of different types of mushroom beds, pisciculture with hosts of studies associated with it, and off-season trials of strictly seasonal crops. An important fall-out which is expected from these programmes is the acquiring of attitudes, knowledge and skills very necessary for intensive and extensive national development activities. SFP also collaborates with many other organizations in science club type activities. For example, in Batangas province a Philippines Youth Civic Action Programme for Countryside Development and Citizenship Training has been organized by SFP at Tanawan Institute. The project is based mainly on agriculture involving simple experiments and investigations in which the principles of natural and social sciences are applied by the students of the school for solving agricultural problems of the surrounding rural communities. One of the main problems of the locality is posed by the scarcity of water for irrigation, and under the project students study various aspects of dry-land farming and water conservation. One activity, for example, is concerned with the adoption of highland rice varieties (supplied by the International Rice Research Institute) under conditions of limited water supply. A study is going on of the economics of cabbage cultivation during the rainy season using polythene canopy. Another project involves impounding rain water for irrigation. Implementation of this project required the presence of the students outside their normal school hours and also during the school holidays. Initially there were objections from the parents, who required the help of their children at home and in their farming activities. With time, however, the farming community has started appreciating the training in scientific agriculture their children are getting through participation in these out-of-school scientific activities, and objecting parents no longer pose a problem to Tanawan Institute. This may be taken as a favourable social indicator of the success of the programme.

The development of science clubs has led naturally to the organization of science camps of diverse types, including permanent field work centres in different Asian countries. Through their sustained efforts extending over nearly two decades organizers of the Field Work Centre (FWC) at Thondaimannaru in Sri Lanka have established what has very aptly been described as the largest open air laboratory for out-of-school science education. The idea of establishing a field work centre in Thondaimannaru was conceived by a group of dedicated science teachers who were associated with the Hydro-biological Survey of Thondaimannaru – a ten year project which started in 1963 when the Thondaimannaru Lagoon was dammed to reclaim land and provide a source of fresh water. At the conclusion of the Survey, the need for a permanent station where teachers and students could camp and carry out field activities and associated out-of-school programmes was keenly felt. The School Science Field Work Centre (SSFWC) started functioning in 1970 and has since then undertaken a variety out-of-school projects, many of which are oriented towards the development of the fishing and farming communities inhabiting several tens of square miles around the lagoon area.

During the Unesco-ICC Asian Youth Science Camp on the Green Revolution held in 1974 in Thondaimannaru, for example, some of the projects carried out and reported in the camp were on problems facing beeta vulgaris cultivation at a village near SSFWC, manioc cultivation in the Jaffria peninsula, effects of artificial manure on chemical composition of soil, observations at Rasaveethy Farms (an area of intensive cultivation) in the context of the Green Revolution, diseases of chilli, brinjal and ladies finger (okra) plants, determination NPK ratio in natural manure, estimation of population expansion in a village by the random sampling method, effects of agrochemicals on earthworm population, and artificial substratum cultivation. Farmers benefited from this and similar camps organized in the Centre in two ways. First, by direct involvement when their specific problems were investigated as an out-of-school activity. They also experienced incidental learning by watching others work on different projects and asking them questions. The Centre has carried out exploratory studies on the fishery potential of the Thondaimannaru lagoon and in 1976 a long term programme was launched by stocking the lagoon with chanos chanos (Milk fish) fingerlings. Some of the technical problems associated with the project like the conversion of rice bran into pellets to prevent wastage of water current and to reduce sedimentation, and design of an automatic feeder are being tackled by local studetns. Incidentally, the Centre is also involved in other types of non-formal science education. For example, it has organized, as a part of its adult education programme, a camp for fishermen with a view to improving their trade, by using simple scientific technqiues.

The National Council of Educational Research and Training (NCERT) is the most important governmental organization in India which actively participates in as well as promotes all types of pre-university educational activities throughout the country. In the field of out-of-school science education its role is mainly promotional (an important exception is the organization of national science fairs described below), supporting a number of projects run by various active organizations. In one such project, the Indian Association for Extracurricular Scientific Activities (IAESA), a non-governmental organization which tries to co-ordinate some of the activities in the field of out-of-school science education, is preparing resource materials for some areas of non-formal education,

using the services of several rural and a few urban science clubs. Rural science clubs participating in the project deal with problems which are relevant to their respective communities. Typical examples are studies on bee-keeping including fabrication of low-cost equipment, investigations of the cause of failure of mango crops in the locality, studies on pests infecting some economic crops in the area, use of water hyacinth extract for growth promotion in plants, fabrication of simple water evaporation type refrigerators for agricultural storage, studies on the relationship between protein intake and health problems in rural communities, and studies on the simple physical-chemical properties of wood and their importance in the fabrication of wooden wares. One of the participating rural science clubs, Gobardanga Renaissance Institute, has organized, with the help of IAESA, workshops of rural science clubs on different aspects of bee-keeping. One of the important aspects of many of these rural science clubs is that they owe their origin to local initiatives. They act as an important link between the rural communities and urban scientific institutions which take an active interest in their problems. In addition to their usual functions, the Birla Industrial and Technological Museum (BITM) in Calcutta and the Visvasvaraya Industrial and Technological Museum (VITM) in Bangalore carry out important promotional activities for science clubs, including those in the rural areas.

Science fairs and science museums

Participants in science fairs organized at various levels – local, regional or national – in the Asian region are mostly school students. Over the years the exhibits shown in these fairs have undergone a rapid transformation, from a preponderance of simple models and charts related to the formal curriculum to exhibits based on field work and projects carried out by the participants, quite frequently as members of a team. Another interesting trend which has been observed is that many of the science fairs are organized around a theme like eco-crisis or the green revolution. Rural students benefit from these fairs in many ways. Their exposure to urban students doing similar things in a similar manner puts an end to the elitist image of urban schools. In many instances the themes of the fairs are of greater relevance to rural environments. Moreover a valuable lesson can be learned by observing how the same topics have been treated from different viewpoints in different exhibits. Agricultural fairs, which are often organized in rural areas, are not only popular but also instructive.

Museums of science and technology have now come into existence in many countries in Asia. These museums have evolved very far from their traditional role of collection of exhibits and are now out-of-school science centres for diverse types of activities. As we have already noted, they often promote science clubs in neighbouring areas. Mobile museums have now added a new dimension to their activities. These 'musobuses' have now made scientific and technological exhibits available for viewing in remote rural areas. The nature of the exhibits is often modified to suit the interests of rural populations. The establishment of regional museums has also strengthened the link between museums and rural populations in many cases. Comprehensive science museums, like BITM in India and the National Scence Museum in Japan, are examples of how such museums contribute greatly to out-of-school science education.

In countries where there are no national organizations for co-ordinating out-of-school scientific activities, organizations like science museums often take on such responsibilities till the formation of such organizations. The Museum of Science and Technology in Dacca functions as a centre for the promotion and assistance of out-of-school science education throughout Bangladesh. It assists several hundreds of science clubs which are now functioning in the country, organizes science fairs, symposia and seminars, and popular science talks in many remote areas of the country, and is planning to extend such activities to each of the nearly five hundred thanas in Bangladesh shortly.

Out-of-school education through rural extension and training

So far we have considered out-of-school activities which are not restricted to clienteles with specific professions or trade. Since most Asians in rural areas still depend directly or indirectly on agriculture for their living, we shall consider agricultural extension and training programmes as examples of out-of-school science education designed for specific occupational groups.

The primary objectives of agricultural extension service are to increase the efficiency of agricultural farms, increase farm incomes and thereby improve the quality of life of the farming community. These objectives are implemented by non-formal education of the farmers, providing them with advice and information and, in general, helping them solve their professional problems using various educational techniques.

There is a consensus among economists that technical progress is a very important promoter of economic growth. Agricultural extension service, being an agent of modernization of agricultural practices and techniques, has therefore a very important role to play in rural development and transformation. In order to be successful, it must be flexible enough to adapt itself to differing stages of development of the communities it is intended to service. Areas of emphasis of extension service will therfore vary as the economy develops, from locality to locality and from time to time.

During the first stage of agricultural development, farmers produce mostly for their own subsistence, largely using traditional agricultural techniques which have been handed down from father to son for countless generations. For communities in this stage of development, extension service must be production-oriented and help farmers increase their output by encouraging them to use improved varieties of seed, to use fertilizers and agro-chemicals in optimum quantities, use better irrigational techniques, use improved agricultural tools and the like. Many countries have barely progressed beyond this primitive stage. During the second phase of development characterized by the production of surplus agricultural commodities, extension service helps farmers on economic issues like marketing, distributing, pricing, and quality control of products. Some of the developing countries have reached this phase of agricultural development. The third stage of development, when agriculture becomes extremely specialized and capital intensive, is not relevant for the present report.

For obvious reasons successful extension services are based on friendly persuasion rather than on heavy-handed compulsion. Instead of farmers being told what to do, far better results are obtained if the advantages of the new techniques are explained and,

if possible, demonstrated to them, so that the final decision for adoption of the techniques or otherwise rests entirely with them. It is, therefore, necessary for extension workers to be thoroughly conversant with the values and the ways of life of their clientele.

Various approaches used by extension services have been conveniently classified by social scientists into the subjective and the objective approaches. The subjective approach deals with how the target group is reached, and one can identify three main methods. New technologies can be successfully introduced in a traditional community using the persuasive power and support of its leaders, who might even be its religious leader. Another subjective way is to approach farmers individually. The third approach is to reach the farmers in groups. One of the most important and often difficult tasks facing an extension worker is to determine beforehand which subjective approach will yield best results for a particular target group.

Owing to the limited resources which are usually available for extension service, it may be necessary to restrict its activities to certain geographic regions (say, black soil regions) or certain types of crops (say, long-staple cotton) or to target groups with specific characteristics (e.g. "progressive farmers"). These approaches, which follow the carefully chosen "subjective" approach, are examples of "objective" approaches in extension work.

From the point of view of organization, extension services can be broadly classified into three types: the divided type, the consolidated type and the unified type. In the divided type of extension programme, each technical department or organization has its own extension service; in the consolidated type of extension, all extension work catering to agriculture proper is under one organization, while activities outside agriculture proper like forestry and pisciculture are served by other organizations; in the unified type all extension service to agriculture in its broadest sense is brought under one organization. In the Asian region, extension work generally started in a divided manner but now the trend is towards the consolidated or unified type.

We shall now consider some examples of agricultural extension programmes in the Asian region. Soon after its establishment in 1959 the Academy for Rural Development in Comilla, Bangladesh launched a number of development programmes in surrounding villages. Recognizing the fact that rural development is most effectively carried out horizontally through the participants' own institutions rather than vertically through hierarchically structured institutions imposed on them from outside, the Academy carried out pilot scale experiments in Comilla in the early sixties. Success of this experiment encouraged the programme to extend to other areas, so that a substantial fraction of rural Bangladesh is covered by it. The Comilla project is based on the creation, operation and administration of agricultural co-operatives established in the participant villages. The villagers themselves choose the chairmen of their co-operatives. The co-operatives borrow funds on the collective security of their members to acquire implements beyond the reach of individual farmers. They also choose one of their own members to be sent to the training centre established by the Academy so that this "model" farmer rather than an extension agent from outside liaises with outside sources of knowledge relevant to their felt needs. The model farmer attends the Thana (county)

training centre once a week and he communicates whatever he has learned to the weekly meeting of the village co-operative, attendance of which is, in principle, compulsory for all members. There is thus a continuous transfer of knowledge to the grass-roots level through this "training-knowledge-communications" system. The model farmer is also responsible for developing his farm for demonstration purposes. For this purpose he is also supplied with printed materials on new technologies. Some of the major technologies which have been introduced under the project are: (a) introduction and operation of low-lift pumps for irrigation; (b) pilot and development of low-cost hand dug tube wells; (c) pilot and adaptive research for the use of tractors for rice and other crops; (d) adaptive research and testing of new crop varieties and farm animals; (e) adoption, supply and promotion of fertilizers and agro-chemicals; and (f) use of cold storage plants and introduction of new technologies in dairy processing, rice milling, and other endeavours. In spite of some weaknesses, the Comilla approach must be considered as more successful than conventional extension programmes.

Every good extension service should permit a two-way flow of information and should be closely linked with the corresponding agricultural research institute. An important example of such an extension programme is provided by the training programme conducted by the International Rice Research Institute in the Philippines (IRRI) of extension leaders for promoting new rice varieties. Introduction of high-yield rice varieties, developed in the sixties, depended on a number of interlinked and complicated factors and this called for special training programmes for extension agents. The first training programme was organized by IRRI in June 1964 and the first trainees were farm management specialists and village (barrio) farm management agents from the Agriculture Productivity Commission (APC) of the Philippines. The training programme aimed at making each trainee proficient in all aspects of rice production, e.g. soils, entomology, weed control, and diseases of rice plants with special reference to high yielding cross-bred dwarf varieties introduced early in the same year. Each of these trainees developed into a full-fledged rice production specialist and provided barrio technicians within the region under his control technical assistance, help in trouble shooting and periodic refresher training on topics related to rice production. New information on rice production flowed to the rice farmers through these rice production specialists and simultaneously all rice related problems of the farmers beyond their specialization were transmitted back to the research workers in IRRI. This ability to maintain a two-way flow of information contributed largely to the success of the programme. Very soon the programme was extended to include participants from various countries interested in introducing high-yield varieties of rice in their agricultural system. The emphasis in the training programme was on practical field experience in rice production and the trainees, individually or in small groups, actually carried out rice cultivation in plots alloted to them. The trainees performed every operation, from preparing the land to the harvesting, and also experimented with and demonstrated the effectiveness of alternative techniques. The training programme also stressed fundamentals of communication and extension and applied research methodology. Thus, an important aspect of training dealt with methods and inputs necessary to change the behaviour pattern of farmers. Identification of desired learning outcomes and specific instructional techniques and content necessary for achieving these objectives formed an important part of the training. Wherever possible, the impact of the training programme on rice production was assessed and on this basis the programme

must be considered an example of a very successful extension activity in rural development.

Non-formal science and technology education for integrated rural development

Sectoral extension and training programmes are also contributing significantly to rural development. For example, programmes to develop functional literacy in villages, programmes aiming to improve health and hygiene of the villagers, and vocational training for rural areas have been organized in many Asian countries and they are contributing very significantly to rural development through their non-formal educational inputs, in which science and technology components play very important roles. However, these divided sectoral approaches have led to development in their respective fields only. The processes of development, as we have noted earlier, are strongly interlinked so that proper development implies harmonious and symbolic progress in all sectors. In this section we shall consider some integrated rural development projects with comprehensive objectives.

An integrated development project for general population. A number of integrated rural-biased development projects now operate in the Asian region. Sometimes even within the same country several such projects are organized by different institutions which focus either on different target groups or on different sectors of development (obviously in the latter case integration should be considered as partial).

The Nutrition Center of the Philippines, the Green Revolution, the Population Center of the Philippines and the Environmental Center of the Philippines have jointly organized a socio-economic integrated development programme, which has been named Project Comparison. The main objectives of the programme are:

i) To increase agricultural productivity and livestock improvement; to increase the production of poultry and fishery products using appropriate technologies;

ii) To improve the nutritional status of the family through increased consumption of vegetables, fruits, poultry and fish; to recommend nutritional levels and thus prevent occurrence of malnutrition;

iii) To motivate eligible couples to have only that number of children which they can rear properly; and

iv) To develop environmental awareness by providing information on environmental management, and to motivate families towards the improvement of their surroundings.

For organizational purposes, the project takes advantage of the already existing barangay network which divides the country into small administrative units. Each barangay is further divided into smaller subunits called purongs. Each purong is further subdivided into groups, each of which contains twenty families. Each group has a unit leader who acts a two-way link between the individual families and the central organization.

Each unit leader has to undergo a preliminary training which enables him to conduct a house-to-house comprehensive survey. This survey allows the unit leader to assess the basic developmental data regarding his own community. The results of the survey thus provide base line data for all subsequent quantitative measurement of progress. Typically during this data collection phase, the unit leader locates and identifies malnourished children, counts the approximate number or quantity of vegetables of different types, counts the number of his neighbours who have easy access to clean drinking water, notes how they dispose of their garbage, counts the families which have sanitary toilets, and so on. He also discreetly collects data regarding family planning practices in the community. When the collection of data is completed, the unit leader rejoins his training classes. Utilizing the expertise available at the training centre, the unit leader prepares a simple plan of action for development to carry out when he returns to his community. The plan is collated by the barangay family development committee and forms the basis of municipal and provincial plans on the extension of services and commodities to the villages concerned. Adoption of this horizontal multi-dimensional extension service, implemented through a single member of the family group, has made reception at the grass roots level extremely favourable and accounts for the quick growth of the programme. Many of the important activities of the four organizations responsible for the implementation of the project also contribute to rural development. Under the *Ipil-ipil* campaign, for example, villagers are encouraged to plant the fast growing leguminous tree called *Ipil-ipil* (the "miracle tree") which not only prevents soil erosion but also enriches the soil through nitrogen fixation; moreover the leaves of the tree can be used to supplement dietary protein especially in animal feed.

An integrated rural developmental programme involving youth. So far we have considered those development programmes which, even if their implementation is carried out horizontally, are essentially conceived at higher levels. In some parts of Asia (e.g. in Tanjore in India, the Boys Town Programme in Sri Lanka, and elsewhere) interesting development programmes have been launched purely through local initiatives. We shall consider here a remarkably successful project in the Jambung district in Eastern Java, which was organized by the *Bupati* or the Head of the district with enthusiastic local co-operation. The *Bupati,* who was a man of vision with sympathy and understanding of the needs of the people under his administration, gained the confidence of the rural people by undertaking several emergency measures, short-circuiting usual bureaucratic delays, to solve several urgent problems of the district. He himself, and at his instance and urging, administrators at different levels under him, toured the villages extensively and frequently, talked with the villagers, asked about their needs, and got their opinions about administrative matters, so that the communication channel between the people and the officials in the district was kept wide open. Even the popular folk entertainment media like *ludruk* were used to disseminate information about governmental plans and actions. The *Bupati* also revived and utilized the traditional spirit of *gotong royong* or mutual self-help among the villagers. Taking advantage of the enthusiasm and the spirit of good will and collaboration generated through these actions, a comprehensive education programme involving the youth population of the Jambung district was launched in early 1967. The programme went far beyond the confines of purely educational activities and developed into an integrated rural development project involving the youth.

The activities carried out under the project were varied and many, but all of them satisfied the primary objective of developing the knowledge and practical skills of the young people so that they entered the world of work with confidence and with a strong sense of community responsibility. Thus a group of school leavers and dropouts were given general agricultural training at an agricultural training centre, while another group of dropouts were trained in animal husbandry and poultry raising, yet another group took a course in inaland fishery utilizing the facilities of the Inland Fisheries Development and the community education centre. Members of the *Wira Karya Tarune Bumi Pramuka* Troop (or youth organization) were trained in operating and managing rice-hulling machines. In the first seven years, the learning areas covered by the programme included agriculture, pisciculture, food technology, animal husbandry, non-agricultural skills like tool making, housing and building techniques, road building, maintenance of agricultural and common machinery and equipment, health and family welfare, cultural education and compensatory literacy training. In accordance with the spirit of this programme, curricular changes were also made in the formal education in the schools. Thus appropriate educational experiences were devised for varying groups and the skills gained through them were used in profit-making enterprises which could be sustained in rural areas. The economic needs of the community were matched with the corresponding educational programmes.

Organization of this comprehensive programme demanded co-operation and co-ordination between various developmental agencies of the government, teachers and trainers of educational institutions within the district, private and public enterprises, voluntary organizations and the rural communities. For this purpose an institution known as the Body for Guidance and Development of Education (BGDE) was set up. All persons who played a direct or indirect role in the organization of the programme were included in BGDE at various levels. Main guidance came from two teams co-ordinated by the *Bupati* himself, viz. the Ideological and Intellectual Support Team and the Administrative and Materials Support Team. The planning, execution, supervision and investigation of the programme were carried out by four committees with well-defined areas of responsibilities. It is also interesting to note that a part of the cost of the programme was met out of the sales of services and commodities generated by it and from the share of profit from co-operative projects under the programme.

Integrated rural development based on self-help. The Sarvodaya Movement in Sri Lanka and the Saemaul Undong in Korea are examples of an alternative strategy for integrated rural development in which self-help and co-operation among the participants furnish the primary motive power for their implementation. The philosophical foundation of each of these programmes is deeply rooted in their respective national cultures and traditions, which is in direct contrast to most of the projects discussed so far. These programmes also attempt to deal simultaneously with social reformation, often fighting against traditional weaknesses opposing development.

The Sarvodaya project aims at establishing through direct action in the village a new pattern of social relationships based on Buddhist philosophy and Gandhian principles. Sarvodaya action starts with *Shramadana* or the gift of voluntary labour for self-help. The next stage is *Gramodaya* or awakening of the village, followed by the community decision making and the self-rule stage. Ideally, the fourth and the last

stages of Sarvodaya are awakening of the country and the world respectively. All the evolutionary stages of Sarvodaya call for education of all participants to acquire different varieties of vocational skills as well as to gain understanding of the social, economic, cultural and religious problems of the country.

In the Sarvodaya Movement the basic unit is never the individual but the community. Emphasis is placed on the notion of control over local circumstances, and for this purpose participants are divided into a series of local networks, e.g. the young children, the school-age children's group, young persons trained for self-help and rural development, trained farmers, the mothers' group, teachers' group, and organizers' group. The main training activities are the training of young girls for pre-school teaching and for work in community kitchens, training of youth for rural development work including community leadership, and agricultural training and training in crafts and skills. Training of the pre-school instructors includes practical work in Sarvodaya villages and covers subject matter related to child development, nutrition, sanitation, and hygiene coupled with a study of Sarvodaya philosophy. Technical and occupational training programmes in rural industrial and agricultural skills are organized for different groups and they often lead to introducion of appropriate modern techniques and occasionally to the generation of new occupations.

The aim of the Sarvodaya movement is the satisfaction of the basic human needs through voluntary co-operative labour, coupled with training attempting to change the attitude, values and behavioural pattern of the participants so that, ultimately, self-interest merges with the interest of the community. In this process the programme attempts to alienate the participants from social evils like casteism.

During the last twenty years of its operation the Sarvodaya Movement has spread to over two thousand rural communities of Sri Lanka, indicating its appeal to people at grass-roots level.

Saemaul Undong is a new community movement which was initiated on a pilot scale in the Republic of Korea in 1971. The movement is based on the practice of the Saemaul spirit of diligence, self-help and co-operation. Co-operative social movement has a basis in many Korean traditional community practices like *hyangyak, kye, tonghoe, tongge, ture,* and *pumasi.* As a pan-national activity Saemaul Undong can be divided into three movements: spiritual reformation based on the practice of Saemaul spirit, a social movement which repudiates the Confucian attitude favouring pure learning over physical labour; and economic development aiming to improve productivity and employment. Successful pilot scale experiments led Saemaul Undong to be initiated on a full scale in 1972. During this phase the emphasis of the programme was on improvement of the living environment. In 1973 it developed into a nation-wide programme in which priority shifted to income generating activities in those villages which had already demonstrated the spirit of self-help and co-operation. In 1974 the emphasis of the programme was on income generating projects, diffusion of Saemaul training and initiation of the urban Saemaul Undong. The world wide energy crisis made a shift in the areas of the project and in 1975 such areas included increase in food production, thrifty living and energy saving. Also in this year attempts were made to transform Saemaul Undong from a governmental movement to a popular one. The year 1976 was devoted to

continued enrichment while in the next year the foundtion was laid for making the programme self-supporting. In 1978 emphasis was placed on accelerating the self-supporting growth while 1979 was aimed among other things at both bringing about economic growth and spiritual enrichment through the establishment of a rural welfare society.

Saemaul Undong is a multi-dimensional development movement and has rich educational training projects involving formal and non-formal activities. Projects vary in content and strategy according to their respective clientele but all of them conform essentially to the spirit of Saemaul Undong. As an example of success which can be attained using the spirit of self-help and co-operation, we shall consider the development of Samgun village – which is now renowned as the Mulberry community. Villagers in Samgun used to cultivate rice but the sandy, gravel-filled soil was not at all suitable for the purpose. As a result, the villagers lived miserably at barely subsistence level. A Samaul leader living in the village tried to break the vicious circle of the community depending on a single crop by trying to introduce sericulture in the village. His first attempts to grow silkworms failed. Undaunted he received advanced training in sericulture at the local office of Rural Development. His next attempt in sericulture was successful and very soon villagers were eagerly learning sericulture techniques from him; within a span of only five years Samgun has become a centre of mulberry cultivation and seedling production. The experience gained in growing mulberry seedlings has been applied to the production of seedlings of other trees and Samgun is now a thriving community. The spirit of self-help and co-operation has been extended to other areas, e.g. in the improvement of the environment of the village, and reinforcement of dikes on a nearby river for the purpose of flood control. Saemaul Undong abounds with such success stories.

Out-of-school education of women for rural development

Lack of access of village women to education is one of the major factors which stands in the way of rural development. Unemployment and underemployment are most acute among rural women. Participation of women in community decision-making is an extremely rare phenomenon in most Asian villages and the situation will not improve unless education of women is given a high priority. Education of women, especially of girls, would help in reducing population growth.

It is unfortunate that in many instances, where the education of women for development of skills is not emphasized, implementation of rural development programmes has led to the loss of employment by women. Introduction of new rice technology in Bangladesh, for example, transferred manual processing of paddy by women to milling carried out in rice mills, where, as a rule, only men are employed. Out-of-school education programmes for enhancing employment possibilities of women, for increasing the possibility of participation of women in community decision-making processes and for controlling the population explosion have extremely important roles to play in rural development. In the following, we shall briefly consider a few such programmes for rural women.

During the implementation of the Comilla rural extension programme through agricultural co-operatives, an attempt was made to develop women's participation in

them. However, attempts to give women income-generating employment occasionally ment with opposition from males entrusted with decision-making. Hence at a later stage women's co-operatives were organized separately, encouraging women to participate more freely in the decision-making process. Women's income generating activities were also viewed as separate from farming activities, which remained under the control of male participants. The Women's Programme organized by the Academy of Rural Development was intended to rescue women from their physical and psychological seclusion to enable their productive capabilities to be merged into the mainstream of rural development. On the basis of exploratory conversations between the villagers and the Academy staff, a series of training programmes was organized at the Academy. The training classes have included subjects like functional literacy, poultry raising, gardening, spinning, sewing, silk-screen printing, in addition to child care, maternity diseases, sanitation, first aid, and family nutrition. A separate specialized training programme has been organized for mid-wives. Later the family planning project involving action, promotion and research were integrated into the Women's Programme.

The Sri Lanka Mahila Samity, which is the National Women's Association of Sri Lanka, has organized training activities which are directed exclusively towards women, especially from rural areas. The Samity has established a number of branch samities all over the island. Volunteer workers from the branches are given training at a training institute established by the Samity. The course content of the training programme includes general topics like health, agriculture, nutrition, thrift, co-operation and family planning. These courses are conducted mainly by the officials of the respective departments of the government. The trainees are also given practical and theoretical training in specific topics such as agricultural handicrafts, embroidery and needlework, bee-keeping and creche work. They also practice organization of rural samity, conduct simulated meetings and programming, so that when they return to their respective village Samities, they are able to conduct local training classes themselves. The Samity also organizes meetings at the local level in which officials speak about health, agriculture, small scale rural industries, and so on, thus exposing the rural women to an experience of information education. A number of model centres are organized by the Samity. In these centres activities in agriculture, needlework and sewing, food preservation and canning, and creche work are carried out. In spite of many difficulties the Samity has experienced over the many years of its functioning, it remains a good example of how women, through their own initiative, can plan, organize and implement their own programmes and contribute significantly towards rural development.

Concluding remarks

In this report we have examined only a handful out of the large number of out-of-school science and technical education projects relevant to the development of rural Asia. Many interesting projects emphasizing one or another aspect of rural development like functional literacy, population education, and vocational training have been implemented in this region. These integrated and sectoral projects have shown that future development of out-of-school science and technology education for rural development in Asia will depend on a number of factors, some of which are discussed below.

In the developing countries in Asia, it will be necessary to shift emphasis of educa-

tion from the formal system to the non-formal sector. In particular, a shift should be made in terms of increased allocation of available resources to non-formal activities. It must be realized, however, that non-formal science and technology education must not be regarded as competing with or as inferior to or as a supplement to the corresponding formal education. In order to increase the acceptability of non-formal education to the rural population, especially to the young people in the villages, ways and means must be devised to allow for easy mobility of participants from non-formal to formal streams. Out-of-school programmes should not, therefore, confine themselves exclusively to the development of locally needed skills. For symbiotic development of formal and non-formal science and technology education, it would be desirable to include elements of one stream in the other. It would perhaps be necessary to encourage development of hybrid projects which combine the usefulness and relevancy of both formal and non-formal science and technology education.

It will be necessary to develop large varieties of out-of-school programmes to satisfy diverse types of developmental needs. Experience shows that successful projects are best derived from locally developed initiatives which satisfy the needs and priorities as perceived at the grass-roots level. It would be necessary to co-ordinate these programmes and perhaps to extend them geographically through the development of institutional structures which should be sensitive to the needs and priorities of the rural population. Such institutions should be able to mobilize resources locally as well as nationally, combining harmoniously the efforts of governmental, non-governmental, voluntary and other organizations in the field. They must also establish two-way communication channels between all levels of organization.

Implementation of out-of-school projects often depends critically on the training given to their implementors. Owing to the diversity of the objectives of these projects, it is necessary to arrange for different types of training programmes and establishment of training centres in rural areas. An important element of the training programme would be to consider case studies of successful and unsuccessful projects of similar types carried out before, under at least approximately similar conditions. Consideration of feedback from the trainees in the field should also form a part of the training programme.

Establishment of national and regional clearing houses and information networks extending to the rural areas, dealing with different aspects of out-of-school science and technical education should be encouraged.

Participation of women in these programmes has been almost marginal. In many cases, women take decisions regarding only those programmes which are exclusively meant for them. Further, practical training of rural women through non-formal training programmes is almost always limited to professions which are traditionally carried out by women. It is necessary to extend these training areas to other domains and socio-economic factors.

The majority of out-of-school programmes for rural development emphasize economic productivity aspects of development only. Other aspects involved in improving the quality of rural life should also receive their due consideration. For example, not many projects stress the improvement of rural environment as their primary objective and it would be useful to encourage environmentally oriented projects. Since rural develop-

ment must take a long term view, conservation of rural resources should form a component of out-of-school education for rural development. An important objective of such projects would be to focus on methods which would change the values and norms of the rural participants to encourage better environment.

Institutions like universities, research laboratories, science and technical museums, engineering and agricultural institutes can play important roles in developing out-of-school science and technology education for rural development by establishing communication and field work links with rural areas. Planning and organization of developmental programmes should attempt to forge such links in increasing numbers.

It will be necessary to carry out educational research for assessment of non-formal education. Since development is a multi-dimensional process such evaluation should not exclusively be based on economic cost-benefit analysis.

Rural science clubs and youth organizations with science and technology components in their programmes should be viewed as practical laboratories for out-of-school programmes and should be encouraged accordingly.

Out-of-school science and technical education has often been taken as a development of the Western education system. Quite on the contrary, in out-of-school education the oriental goal of education for fulness and development from within has been synthesized with the productivity oriented philosophy of the academic, which previously stressed development from outside. In Asia pioneers of education like poet Rabindranath Tagore gave practical shape to this synthesis in their own education systems, founded in the early years of the present century long before out-of-school education became popular in the West. Out-of-school science and technical education should be viewed as a practical realization of this synthesis.

EDUCATION FOR SUSTAINED IMPROVEMENT OF TECHNOLOGY IN RURAL AREAS

by

C. Prasad*

Introduction

Rural development, as our experience has shown, is a complex and formidable task, and has to be a continuous concern for any developing nation. The efforts in the past for rural development have amply indicated that the subject of rural reconstruction cannot be treated as a proposition for one or two five-year plans; it has to be viewed as an on-going phenomenon, though the focus and priority areas may change with advances in technologies and changing rural socio-economic conditions.

Rural development has baffled people; its intricacies are only partly understood. An attempt at rural development, therefore, would mean approaching its multiple problems from different angles. Experience and studies reveal that synchronized working of the following components of rural development is extremely important for rapid achievement of our goal in this respect:

1. Political will of the nation;
2. Appropriate research-based technology;
3. Enlightened rural audience/users;
4. Trained and committed extension agents;
5. A viable system of technology transfer;
6. Availability of adequate and timely inputs and services;
7. A special support to under-privileged/weaker sections of the society;
8. Development system as a continued phenomenon;
9. Participation of all types of institutions;
10. Co-operation and co-operatives;
11. Local institutions and leadership;
12. A holistic approach to development;
13. Support of and linkage with external resources and agencies;
14. Development administration;
15. Research in rural development; and
16. Priority in the development scheme of the Government.

* Dr. C. Prasad is Assistant Director General (Education and Training), Indian Council of Agricultural Research, India. He is also Senior Adviser, FAO, FAO/UNDP Project, Department of Agriculture, Government of Sri Lanka.

These components of rural development do not operate in isolation; they are linked in many cases and in several ways – their interactions in varied combinations in different conditions pose numerous limitations and challenges.

Education for sustained improvement of rural communities by introducing appropriate technologies is a topical subject, and a demanding one which should concern all people, institutions, and agencies; of course, some could be involved directly and others indirectly. This reality in respect of rural development has not yet been understood by many developing nations and the professionals in extension work have not taken it too seriously. This gigantic task and its ramifications have been undermined by many. This is why, in spite of rural development efforts in various developing countries for over half a century, the problems of rural development continue to be a serious concern. The fast growing population in developing nations, thin resources in the face of demanding rural problems, growing apathy of the developed nations towards the developing ones, jealousy and rivalries among people, adverse effects of class and caste structure especially in rural areas, political instability and frequent changes of policies in regard to rural development, poor communications net-works, migration of the enlightened and educated to urban centres, difficulty of replicability of rural development experiences from one country to another, and dependence of the rural people on the government for their development, are some of the fundamental problems coming in the way of faster progress in rural areas.

India is a large country with a population second only to China, nearly 678 million. Since the early 1920s, many efforts have been made both by government and non-government organizations for rural reconstruction. The country has made sufficient progress in its rural development ventures, but much still remains to be accomplished. The journey is undoubtedly long – longer than we expected. During this process a lot of valuable experiences have been gathered which have been utilized in re-orienting organizations and programmes. This paper attempts to bring out some of the vital Indian experiences which could be helpful to professionals in rural development in organizing educational programmes for sustained improvement of technical know-how in the rural areas. Rural development is a function of many subjects, agriculture and allied areas being the priority ones; this paper will deal mainly with the latter.

A strong research support

In the 1950s extension agents in India were criticized for not disseminating scientific know-how in agriculture and related areas at a rapid pace. When the transfer of technology became faster in the 1960s, this contrast was clearer. And then extension agents had an answer: in the past the slow popularizing of innovations was due to the marginal increase caused by the new technologies vis-a-vis the traditional ones; the present technologies have the potential to produce 50 to 100 per cent increases in yields in certain cases. Lately, there has been another controversy over the fact that the new agricultural technologies are capital intensive, and, therefore, are not appropriate for small, marginal and poor farmers. Of course, scientists have pleaded that the innovations are neutral to the size of the farms or for that matter, rich or poor farmers. While the new technologies are capital intensive, the outcomes are proportionately larger. But the fact remains that poor and small farmers have no access to credits and other such inputs and hence such

criticisms are common and continuing. Scientists cannot side-track this issue. Another common concern which extension agents have raised is the *economics* of the research findings which, by and large, are missing from the package of recommended practices and information. This is in a way a failure of the inter-disciplinary approach to research efforts, where agricultural economics should play an important role. Nothing convinces farmers better than increased production and enhanced income.

In developing nations, investments in research in agricultural and allied areas have increased in the last decade, but still are far smaller than investments being made in developed countries. Partly this is a matter of availability of resources in the developing countries, but partly it is due to lack of support to research organizations and programmes, owing to either ignorance or neglect by the authorities. These failings need to be corrected to strengthen the research base for creating necessary applied knowledge for raising production and productivity.

The last decade and a half has been a very active era of research for Indian agriculture. Logically, added efforts have been made in applied research so that the thin resources of the Government could be utilized for something which could bring immediate returns in terms of food production. One can appreciate the competition which has entered into the scientific arena for generating new knowledge, but at times unhealthy competition has resulted in poor quality of work and recommendations. The exchange of research materials and information from one country to another has further helped the improvement of technologies. This has been a very happy trend; but much dependence on foreign research results may not be desirable as Schultz points out: "it would be a serious mistake for Chile or any other country . . . to assume that the international agriculture research centres along with the on-going agricultural research in high-income countries are substitutes for first-rate national agricultural research enterprises."[1]

Broadly speaking, there are four categories of research which should attract our attention: (a) basic or fundamental research; (b) applied research; (c) adaptive research; and (d) operational research. In developing countries, it is very important that applied research be attended to on a priority basis to evolve technologies to boost agricultural production. This does not mean ignoring fundamental research – it only means making judicious use of the limited resources available within developing nations.

There is a very thin demarcation between adaptive research and operational research. In order that findings of applied research find acceptability among farmers, the adaptive research must be conducted in wider agro-climatic conditions for re-defining and modifying some of the recommended packages of practices in order to suit the local conditions. The Indian Council for Agricultural Research (ICAR) has further gone ahead in developing Operational Research Project (ORP), especially in problem areas, to try the recommended technology in the farmers' fields and demonstrate to the farmers and extension workers the efficacy of the research recommendations. Attempts have also been made to observe and identify factors – social, economic or others – which have been coming up as barriers to development. Both at the applied and adaptive research levels, the economics of recommendations have not been given due place, with the result that acceptance of results is not easy within the farming community.

Another important factor has to be given due cognizance. In view of the well recognized need for integrated working of research, extension and training, the role which researchers can play in extension work should be clearly defined, understood and utilized, which is not happening at present. Some researchers have been too enthusiastic and have spent in the past relatively more time on extension work than on their research programmes. In other cases, some good researchers have not paid any attention to extension work, even indirectly. This kind of extreme could be harmful both to research and to extension. The researcher having no aptitude for extension work must not necessarily be dragged into extension activities; in such cases, however, such researchers could at least be indirectly associated with extension agents and activities so that they are aware of the real problems of the farmers, and their research projects are accordingly influenced. Those who have aptitude for both research as well as extension work may contribute to these areas equally efficiently. A system has to be developed where either researchers, educators, trainers, or extension workers have options to choose and devote more time to the areas in which they have experience as well as interest. But this also should not be left so loose that they start working in isolated compartments without the meaningful interactions and exchange of ideas which are mutually beneficial for research, education and extension functions.

This portion of the paper has highlighted some of the critical issues which are occurring in the agricultural research system and in allied fields, and which are affecting adversely the transfer of technology to rural areas.

Approach to rural development

Almost a century ago the term "extension education" was used by Cambridge University (UK) to denote the off-campus educational role of educational institutions. It came, indeed, as an educational innovation – a discovery. Today, it has grown into a full-fledged discipline with its professional dimension – educating clients for acceptance of scientific innovations leading to increased production, better income and a richer life.

The advisory work in Britain and some parts of Europe was established around 1865, earlier than the Co-operative Extension Service in the USA. Britain, thus, initially made contributions to agricultural science and education as well as extension. During the same period extension efforts were made in a rather sporadic manner in the USA by some private societies, colleges and state government departments. It was in 1914 that co-operative extension work was formally launched on a national-wide basis. The USA has the distinction of developing a body of knowledge which put extension education on the map as one of the applied social sciences. At present, most countries have some form of extension service or other, greatly influenced by the American extension system. India has made its own contribution by adopting and advocating the "community development" type of extension service, which is presumably most suited to the developing nations. In the words of the UN Evaluation Commission, the Community Development Programme launched in India in October 1952 has grown into, "One of the major experiments of the twentieth century whose results are of world-wide interest."[2] Several variations of these designs are utilized in different countries to suit their local conditions – the Saemaul movement in the Republic of Korea, the Taiwan model of extension work and others.

The concept of Integrated Rural Development (IRD) has gained wide currency, and with the discovery that the development plans of many countries have been skewed towards elite sections of the society, a sharper focus has been given to it. "So long as the millions live in hunger and ignorance," said Swami Vivekananda, "I hold every man a traitor who, having been educated at their expense, pays not the least heed to them. Our great national sin is the neglect of masses and that is the cause of our downfall. No amount of politics would be of any avail until the masses in India are more well-educated, well-fed and well-cared for."[3]

Mahatma Gandhi gave us the concept of *Antyodaya;* in his view, the utility of all development programmes must be measured against one basic yardstick viz. the real benefits to be delivered to the poorest persons. The Jayaprakash Narayan Committee (1961) recommended special attention for weaker sections of the rural community, which in 1970 was promulgated as "Growth with Social Justice".

Rural development through motivational and persuasive education is a long and expensive journey. But once a systematic and concerted effort is initiated and followed through, the experiences could be lasting and rewarding. We in India earnestly believe that the physical well-being of the individual must co-exist with the freedom and dignity of his spirit, for "every soul is potentially divine". For the survival of the democratic tradition and values, the rural poor must get the basic needs of life. The answer to this baffling problem may be found if the IRD system is well conceived and executed on a war footing, with missionary zeal and commitment.

Early rural reconstruction efforts. Prior to independence (1947), rural development work was a casual affair; sporadic attempts were made here and there both by voluntary and government agencies. For instance, the Ghandhian Experiment in Rural Reconstruction (1920), the Sriniketan Project (1921), the Marthandom Scheme (1921), the Gurgaon Project (1927), the Rural Reconstruction Movement (1932), and the Indian Village Upliftment Scheme (1945), were the early pioneering ventures in this direction.

Soon after independence, the attention of the government was drawn to the development of villages. Some of the initial rural development attempts in the late 1940s were: the Etawa Pilot Project (1948), the Nilokheri Experiment (1948), the Sarvodaya Programme (1948), and the Grow More Food Campaign (1949). These efforts, though insufficient to match the need, provided valuable experiences which, in a great measure, influenced our present Community Development Programme. Lessons worthy of emulation from these programmes were:

1. Multi-purpose Village Level Workers (VLWs) are needed for rural upliftment in order to cope with the multiple tasks and problems with which villagers are confronted. The VLWs must reside in their respective village circles so that they can maintain frequent contact with the clientele and provide timely guidance and regular information support;

2. An integrated approach to resolving inter-related and inter-woven rural problems is essential for counteracting the interacting barriers to change and for promoting balanced growth;

3. A two-way communication net-work between the villagers and rural development workers and authorities is a must; bottom-up communication sometimes is even more important than the usual top-down communication;

4. A systematic, planned and continuous effort is necessary to meet the challenges of rural reconstruction. Realistic plans based on surveys and studies can best guide the course of actions;

5. The villagers need not only scientific information support, but also informal and non-formal education on a continuous basis;

6. Professionalism in rural development was wanting; knowledge and insight on the part of extension workers both about technology and pedagogy, extension design and methodology are necessary;

7. Regular technical backstopping by way of information support and training to development personnel is considered crucial;

8. Government initiatives for rural development on a nation-wide scale are imperative for the salvation of the rural poor; and

9. Economic programmes must spearhead rural development schemes; when one has an empty belly even God cannot be remembered undisturbed and earnestly.

Community development network. Based on experiences within this country and abroad, the recommendations of the Fiscal Commission (1949) and the Grow More Food Enquiry Committee (1952), the Community Development (C.D.) Programme was launched on Gandhi's auspicious birthday, 2 October 1952. The CD Programme aimed at all-round development of rural people through their own initiative and efforts with the government's assistance and guidance. It was to be a people's movement. The programmes were all-inclusive – agriculture, livestock production, health and hygiene, food and nutrition, education, welfare programmes, construction of transport and communication systems, home crafts and village industries. The basic underlying philosophy was that all rural problems are interrelated and, therefore, must be tackled simultaneously in a cohesive and integrated manner.

Realizing that a community development programme is a continuous venture, the concept of National Extension Service (NES) was introduced in 1953 as a method as well as a permanent organizational structure for achieving the objectives of Community Development. Thus, both the CD Programme and NES concepts operated together for some time, but to avoid confusion the CD concept alone now continues. The country was covered with CD Blocks by 1966-67.

The lowest unit of administration for rural development are the Community Development Blocks. There are 4,893 CD Blocks in the country (1971) covering over 480 million rural people. At the Block level all the aspects of rural development are integrated administratively under the Block Development Officer. The total extension staff of different categories at CD Block level alone was 113,041 in 1974-75, of which 96 per cent were trained personnel. From the First Five Year Plan (1951-56) to 1968-69, the country invested Rs. 590.6 crores on CD programmes.

Manpower, science and technology and extension education

Since the inception of the CD Programme, both extensive and intensive approaches were followed –some CD Blocks were in the intensive phase for a specified period of time, while others functioned with a normal budget and programmes. In order to pay special attention to certain areas, some Blocks, for example, were identified as Tribal Development Blocks (TD Blocks), or as Applied Nutrition Programme Blocks (ANP Blocks). (See the map of India showing distribution of CD Blocks).

In the early years, owing to scarce resources being dispersed over a large area, agricultural production could not make expected headway. Hence, a new approach called the Intensive Agricultural District Programme (IADP) was introduced in 1960-61, which envisaged concentration of efforts and resources in potentially productive areas in order to accomplish rapid breakthroughs in production. The results, indeed, were encouraging and this concept was extended to larger areas as the Intensive Agricultural Areas Programme (IAAP) in 1964. The latter differed from IADP in that it was crop and area oriented and extension staff provided was on a reduced scale. Then came the High Yielding Varieties Programme (1966-67) based on the exotic high yielding varieties of cereal crops and packages of improved practices. These varieties served as the kingpin of the new strategy of agricultural development.

The CD Programme from its formative stage has now entered into its early adulthood (over 25 years of history), a conducive period for vigorous and enlarged activity. Even during the early years, it ushered in many-sided developments of which agriculture is the prominent one. Agriculture is basic to the rural economy anywhere and it must find a priority place in any scheme of rural resurgence. In a short period of about 20 years (1960-61 onward) food grain production increased from about 82 million tons to 126 million tons in 1977-78. (Wheat production increased 162 per cent, maize 78 per cent, bajra 73 per cent). Fertilizer consumption rose from 306 thousand tons in 1960-61 to 4.3 million tons in 1977-78 (from 2.6 kg per hectare gross cropped area to 25 kg. per hectare). The net irrigation area increased from 24.7 M.ha. in 1960-61 to 31.5 M.ha. in 1971-72. The total area covered under the high yielding varieties programme was raised from 9.20 M.ha. in 1968-69 to 38 M.ha. in 1977-78. The country has achieved, by and large, self-sufficiency in food and is now in a position to export some food grains.

In the field of livestock production, the Key Village Scheme was started in 1952 for improving the quality and productivity of cattle and buffaloes. In selected areas – in Key Village Blocks, intensive development measures were undertaken. On the line of the IADP/IAAP, a new scheme called the Intensive Cattle Development Project (ICDP) was initiated during 1964-65. The programme was implemented in milk-shed areas of major dairy plants and it provided a package of improved practices to the cattle owners for ushering in the white revolution. Milk production in the country has gone up from 17.5 million tons in 1950-51 to 22.5 million tons in 1971-72; egg production had been raised from 1,832 million in 1951 to 6,040 million in 1971-72. Both in the field of marine as well as in inland fisheries, there has been considerable improvement in fish catch. In 1971, the marine fish catch was 1.2 million tons – a 30 per cent increase over the preceding decade.

In order to give added attention to the upliftment of the under-privileged and economically weaker sections of the society, a series of special programmes has been

launched. The Drought Prone Areas Programme (DPAP) was started in 1970-71 for stabilizing the income of the weaker sections and minimizing the ill-effect of drought on agricultural production. The programme operates in 13 States in 74 chronically drought prone areas covering 535 CD Blocks and 60 million people (12 per cent of the population and 10 per cent of the total area). During the same period Small Farmers Development Agencies (SFDA) were formed to benefit small farmers (landholding 1 to 2 hectares), marginal farmers (less than 1 hectare) and agricultural labourers (having a homestead and 50 per cent wage income from agriculture). The programme covers 1,800 Blocks in 198 districts. Similarly, the Hill Areas Development Programme (1973-74), Tribal Areas Development Programme (1971-72), Whole Village Development Programme (1975-76), Command Areas Development (1974-75), and Voluntary Action Scheme (1974-75) have been undertaken, benefiting millions of rural people.

To support the rural development movement, many new institutions have been created. The National Seeds Corporation (1963) was set up to produce foundation seeds of high yielding varieties. The Agricultural Prices Commission (1965) has been established to advise the Government on prices policy. The Food Corporation of India (1970) was established to purchase surplus food-grains, and cultivation of commercial crops has been extended. The Cotton Corporation of India (1970) and Jute Corporation of India (1971) have come to help the cotton and jute growers. The nationalization of banks (1969) has resulted in easy availability of rural credit. The rural credit flowing through co-operatives and other institutions has risen from 3 per cent in 1950-51 to 40 per cent in 1978.

Integrated Rural Development – A reinforcement. The preceding discussion would indicate that in the CD Programme attempts have been made for integrated development. Nevertheless, the task has been intricate and difficult. Realizing its shortcomings and the urgency of accelerated efforts in this direction, scientists, planners and administrators, have pondered over the limiting factors and have made suggestions for re-orientation or reinforcement of the rural development programmes. Realizing the need for scientific backing to rural development, the central theme of the Indian Science Congress held at Waltair, in January 1976, under the Presidency of Dr. M.S. Swaminathan (DG., ICAR) was "Science and integrated rural development – an agenda for action". The scientific community of the Congress proposed a concrete plan of action to the Government for integrated rural development involving scientific and academic institutions. The Government responded by making an ad-hoc provision of Rs. 15 crores in the Union budget for 1976-77 for funding pilot projects on the subject. The renewed approach envisaged thorough scientific planning, reorganized machinery and involvement of all kinds of scientists, workers and agencies. The programme will be focused on increasing the purchasing power of the rural poor through the generation of greater opportunities for gainful employment.

While the over-all responsibility of implementing the programme was entrusted to the Department of Rural Development, Ministry of Agriculture and Irrigation, the task of preparing resource inventories and action plans for 20 selected Districts was given to the Indian Council of Agricultural Research (ICAR).

A Core Group on Integrated Rural Development working in the ICAR[5] has

developed the following guidelines for organizing a scientific upgrading of the rural economy:

1. The action plans must provide gainful employment and increase the purchasing power of the rural poor, in particular, landless labour, marginal farmers, artisans, women and children;

2. Employment generation programmes must spring from scientific resource utilization strategies; and

3. The programmes should be simple in operation and economically viable so that they are quickly capable of achieving self-reliance and self-replication.

It has been emphasized that the programmes should have no rigid structure; instead, each action plan should be tailored to suit local needs, resources and priorities based upon participation of the local community.

The planning phase accordingly has been divided into 3 steps:

1. Compilation of an integrated resources inventory that will identify natural resources, infrastructure and participants drawn from the rural poor;

2. Undertaking a Malady-Remedy Analysis and preparing draft action plans indicating major breakthrough points; and

3. Vetting the draft action plans with the help of the local community.

Training and visit system. In 1974 the "Training & Visit System" (T&V System) being popularized by the World Bank was introduced in some parts of the country on an experimental basis. Following the first encouraging results, this system has now spread to 12 states; other states are likely to follow suit.

As the document on the T&V System states, "The principles underlying this revitalized extension service are basically simple and can be widely applied to many different situations. The approach contains few really new ideas, if any. Rather it is based on well known principles applied systematically."[6] Under this system the focus is mainly on agricultural production. Therefore, to this effect the administration/ management from the centre to the village levels has been streamlined, reinforced with added staff wherever necessary, and contacts, training, and information support have been strengthened. This formalization of contacts, training and visits has brought about a realization among the farmers of the seriousness of the Government concerning agricultural development programmes, and continued day-to-day and week-to-week support to the farmers. This has brought results in production which have boosted the morale of the extension agency as well as the farmers.

As has been discussed earlier, in India rural development took the style of the community development approach where at the lowest point (CD Block) close to the rural community, all development activities were integrated under the umbrella of one management, the Block Development Officer (BDO). In view of the introduction of the T&V System, the integrated approach received a serious setback. In fact, as things stand,

community development efforts at the CD Block level have been almost segregated and total focus has been given to agricultural production. Thus the social and other components of rural development have been relatively ignored. This is an issue where the government and non-government organizations have to devise ways and means to correct the situation.

Professionalization in rural development

The Community Development programme utilizes basically the philosophies, methods and approaches of extension education. In addition, the community development design is all inclusive in its intent and objectives vis-a-vis agricultural extension, and emphasizes collective efforts by community people in resolving common problems. Thus, extension education, in the Indian context, has to play even a bigger role and to face difficult challenges.

To most people, extension education means only training in-service staff and farmers and a few more limited activities like demonstrations and a farmers' fair for the benefit of people who are interested in agriculture as agents of change or as producers. It is frequently expressed that the agricultural universities have only an educational function with respect to extension. Perhaps the term "education" in the expression "extension education" creates this confusion. The basic is that extension education is an applied discipline like medical education. "Medical practice" is just like extension work/extension activities. All extension activities are educational in character, whether they are undertaken by agricultural universities or by state governments. The main idea is to educate people to accept and adopt new innovations for their economic benefit. In the context of agricultural universities, therefore, only limited extension activities are undertaken to serve as a model for the state extension workers who learn and practise the same in the extension activities and programmes organized by the development departments of the state/central government. Of these activities of the universities, the in-service training constitutes a major part; the idea is that the university should equip the extension personnel of the state department with the latest agricultural and allied technologies so that the extension activities undertaken by them are up-to-date.

There is some confusion with respect to extension education as a discipline, its genesis and status vis-a-vis other social/behaviourial sciences on one hand and agricultural sciences on the other. It is very important in the long-term interest of rural development that the nature and intent of interactions and relationships between *social scientists, extension educators* and *agricultural scientists* are properly and uniform understood.

Agronomy is an applied discipline emerging out of agricultural/biological sciences (Diagram-1). Extension education is an applied social science (applied to agriculture, industry and so on) emerging out of basically the social science/educational fields. In other words, the basic body of knowledge of extension education comes from various social sciences and educational fields. The fields in which extension work has to be done may be agriculture or village industries. This implies that the training content for the extension educators/extensionist has to come from both the vital areas: *extension education* and *subject-matter areas* (applied fields like agronomy, horticulture and livestock production). A fair balance between pedagogy and technology has to be maintained.

This is fundamental to and crucial for extension education as an applied discipline, and for bringing about professionalism.

There are other classes of extensionists: those coming as subject-matter specialists from agriculture and those coming as subject-matter specialists from social sciences. Both of these groups have academic training and specializations in their respective fields – either agriculture or social sciences, but virtually no training in extension education. This is a basic lacuna for effective extension work. In fact, the social scientist in extension education should have at least rudimentary knowledge of agriculture as well as of extension education, especially at the applied level (Diagram-1: TC).

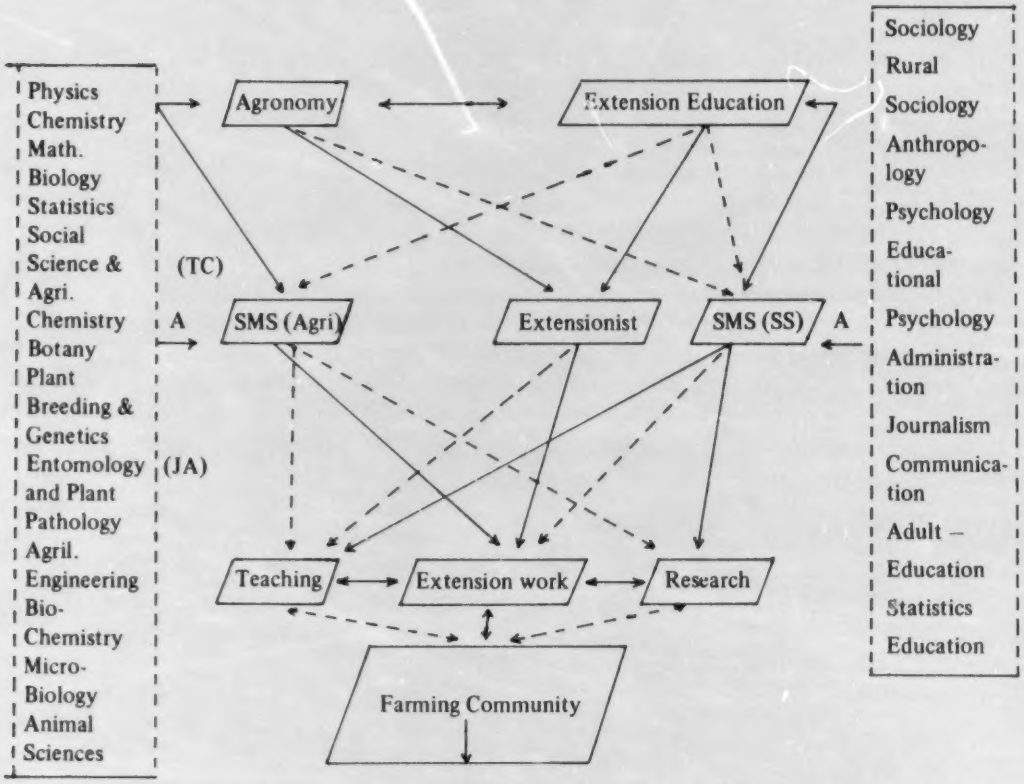
It has to be noted also that the job of an extensionist in the role of extension worker will have to be mainly extension work and limited teaching or research; similarly the role of a subject-matter specialist in agriculture for extenstion work will have to be mainly extension work and limited teaching or research responsibility in his respective specializations; and for the subject-matter specialists in social sciences, who are mainly employed in extension education departments for academic work, the main job has to be mainly teaching and research and limited extension work. It is also essential to understand that subject-matter specialists in agriculture or social sciences represent only a few areas of specialization of their respective disciplines and, therefore, they would be required to take advantage of subject-matter specialists specializing in other branches of their disciplines either for extension work, teaching or research in extension education. (Diagram 1: A).

Agricultural development is an inter-disciplinary area; varied professionals in many disciplines have to be suitably involved for extension work. In fact, this is also true for teaching and research to some extent. The scope of interdisciplinary involvement in agricultural development is too wide and too complex to describe. Bernard Shaw once said that "teaching is too serious a business to be left to teachers alone"; M.S. Swaminathan recently remarked that "farming is too serious a business to be left to farmers alone";[7] and no exaggeration, extension education is too serious a business to be left to the extensionists alone.

Judicious use of the agricultural scientist in varied roles needs to be paid attention to. With the advent of agricultural universities on the Indian scene and the introduction of integrated teaching, research and extension, many professionals/authorities in agriculture have assumed rather ignorantly that all agricultural scientists are equally efficient in and capable of teaching, research and extension functions. This is why, in our agricultural universities, all scientiests are required to function in all the three roles – teaching, research and extension, in certain proportions. But it has to be realized that these three functions are three different professions and, thus, each has its own prerequisites. Rigidly speaking, each must have its entrance requirements in terms of academic qualifications as well as appropriate experiences. A good teacher may not necessarily be a good researcher or extension worker and vice-versa. This aspect, therefore, has to be taken by the university authorities rather seriously and a specific job should be assigned to a scientist not only on the basis of his academic training, but also his background, experience, interest areas, temperament and aptitudes.

There is obviously a temptation on the part of scientists to go for some job areas

Diagram – 1: Agriculture ⟷ Extension ⟷ Social Science: International Model



SMS (SS): Subject Matter Specialists in Social Sciences.
SMS (Agri.) Subject Specialists in Agriculture.
TC: Training Content
JA: Job Areas
⟶ Direct involvement/relationship.
- - - - - - ⟶ Indirect/partial involvement/relationship.
⟷ Mutual Relationship.

and not for others, whether or not they meet the professional pre-requisites. In a study by Debey on job preference by agricultural scientists in agricultural universities, even the scientists in agricultural extension education gave last preference to extension work, while the research and teaching jobs were preferred by most.[8] Such administrative imbalance in job priority has serious implications for rural development.

Educational continuum in agriculture

Education and training in agriculture and allied fields at different levels is one of the most crucial inputs for accelerated production and rural development. An OECD[9] document calls it as an "intellectual investment". The countries which have realized this demand early have advanced agriculturally and have harnessed agricultural production potential in the best interest of the country/farmers. The Republic of Korea and Japan have at least one college or faculty of agriculture for every 1,200 square miles and the number of vocational schools is about four times the number of colleges and faculties.[10] The density of agricultural institutions in these countries reflects the emphasis given to agricultural education and training, and hence they have scored over other countries in the Asian region in the agricultural sector.

The training of farmers, agricultural education in schools, agriculture at intermediate level and higher education in agriculture have to be conceived as a continuum – each influencing the other and, therefore, each linked to the other for mutual professional interaction and benefit. This, by and large, has remained an unrealized dream in most developing countries. Agricultural education and training at different levels have been, in many instances, working in isolation under separate administrative and supervisory controls. Historically, for example, agricultural eduation in schools has been under the Ministry of Education in most countries, and agricultural education at intermediate and higher levels under the Ministry of Agriculture. They function in their own styles without much linkage between them, with the result that agricultural education in schools and at intermediate levels has suffered. Though agricultural education in the school system is an area full of potential, unwittingly perhaps, it has remained untapped. The percentage of school drop-outs is almost 65 to 70 and they are the ones who become the villagers/farmers. If their receptive minds are fired with agricultural science even in its rudimentary form, this will go a long way in building them as scientific farmers through extension education. The two concerned ministries and departments must work hand in hand to resolve the long standing potential issue in favour of faster agricultural growth.

In the past, higher educational institutions in agriculture have never concerned themselves with the intermediate and farmers' level education and training, but under the changed philosophy of educational functionality and academic excellence with relevance, organic relationships between these levels are being fostered. In some countries, agricultural universities/institutions have started taking a direct role in the management of intermediate and lower level agricultural institutions and, in others, higher

institutions have adopted lower level institutions to serve as their laboratories and to given them scientific back-up.

Formal vs. non-formal education. There remains a gap between the scope and importance attached to formal education vis-a-vis non-formal education in agriculture, or for that matter in other fields. The two educational concepts developed at different times – formal schooling being the fore-runner. Hence, we all see relevance in and attach importance to formal education and non-formal education gets the step-child treatment. In view of changed circumstances the world over, the quest now is to find educational and training means to educate the mass producers for added production. This is necessitated by technological break-throughs on the one hand and the ever growing demand for jobs and food on the other. International bodies like FAO, UNDP, and Unesco in their own ways and rights have focused attention on informal and non-formal education in agriculture emphasizing continued vocational training for farmers and fishermen. Such a realization has compelled governments to tilt their policies in favour of informal and non-formal education for the farming communities by providing added inputs and investments. This is, indeed, essential to give agricultural production a boost.

Education vs. training. Another factor which has affected the educational and training systems adversely is the misunderstanding about the proper relationship and distinction between "education" and "training". The former refers to the enhancement of knowledge and understanding about a subject with limited related skills, whereas the latter is concenred mainly with developing vocational skills, with limited emphasis on understanding and knowledge about the acts or operations. The training institutions, owing to their academic/theoretical orientation perhaps have tended to be more educational in character than training-oriented. In training institutions such a tendency has to be curbed.

Training institutions, depending upon the level of literacy and enlightment of the clientele, must give some amount of general/liberal education – functional literacy, citizenship education, community living and relations, local leadership and the like. Development of a proper outlook and values together with vocational skills will build our rural society on a sounder footing.

Skill training support

Krishi Vigyma Kendra. Skill training for practising farmers and fishermen, and the in-service development staff at different levels seem to have been given limited attention. This should be a matter of great concern to all the government and non-government organizations which are interested in and committed to agricultural advancement/rural development.

Since the inception of the CD Programmes, several institutions have undertaken training for farmers and in-service personnel – agricultural universities/colleges, research institutes, *Gram Sevak* Training Centres, Study and Orientation Training Centres, Farmers Training Centres and many other voluntary agencies. The Government have accepted the "Training and Visit System" of extension approach in association with the World Bank. In some institutions regular training courses have been offered, whereas in

others they have been organized on an *ad hoc* basis. The number and type of training courses offered have been much less than required, and, in fact, they seem to have suffered in terms of (a) weak subject-matter support; (b) academic approach and methods of training; (c) absence of facilities for practical training; (d) training programmes unrelated to immediate needs; (e) stress on quantity rather than quality; and (f) limited financial support for training infrastructure. To overcome this serious lacuna in the field of training, an innovative institution called *Krishi Vigyan Kendra* (Farm Science Centre) has been evolved by the Indian Council of Agricultural Research.

The *Krishi Vigyan Kendra* is a grass-roots level institution designed and devoted to imparting need-based and skill-oriented short and long-term vocational training courses to an agricultural clientele. The Dr. Mohan Sinha Mehta Committee[11] laid down the concepts of the *Krishi Vigyan Kendra* as follows:

1. The *Kendra* will impart learning through work-experience and hence will be concerned with technical literacy, the acquisition of which does not necessarily require, as a precondition, the ability to read and write;

2. The *Kendra* will impart training only to those extension workers who are already employed or to practising farmers and fishermen. In other words, the *Kendras* will cater to the needs of those who are employed or those who wish to be self-employed; and

3. There will be no uniform syllabus for a *Kendra*. The syllabus and programme of each *Kendra* will be tailored according to the felt needs, natural resources and the potential for agricultural growth in that particular area.

The *Krishi Vigyan Kendra* is based on three fundamental principles: first, agricultural production is the prime goal; second, work-experience (learning by doing) is the main method of imparting training and education; and third, stress on weaker sections of the rural population. The idea is to influence the production system with social justice, the starting point being the most needy and deserving sections of the society – tribal farmers, small and marginal farmers, agricultural labourers, and drought and flood-affected farmers.

Trainers' training centre. The kind and quality of training being envisaged in the *Krishi Vigyan Kendra* demands practical and experienced trainers. The trainers should be in a position to demonstrate the skills effectively to the trainees by actually doing the operations themselves. Such trainers/teachers, owing to our academic-oriented education and training, are not easily available. The Trainers' Training Centres (TTC), therefore, are being established in specialized subjects mainly in the ICAR Research Institutes. In addition, the TTCs will offer in-service training courses for the trainers/instructors of the extension training centres, agricultural schools, and teachers dealing with work-experience and vocational courses in high schools and higher secondary schools. A few TTCs are being established exclusively for providing in-service training to women trainers and teachers. The TTCs are all-India institutions, but in due course regional centres will have to be established to meet the heavy demands of in-service training.

The TTCs are being manned by senior and experienced staff in the specializations

concerned. The methods and approach of training will be more or less the same as in the KVS. That is, a major part of the training would be imparted by work-experience and the rest by lectures and discussions. The training will include both technology and pedagogy in the proportion of about 75:25. Further, a part of the training of the trainers will be given as a "training practice" in the KVK attached to each of the TTCs. Each trainer/teacher will be required to give 10-20 "training practice lessons" in the attached KVK. Thus the training will bear some similarity to the teachers' training courses (B.Ed. and M.Ed.) of the general education system.

Agriculture university & non-formal education

Unlike the traditional universities, the agricultural universities are goal-oriented; their immediate task is to raise agricultural production for meeting the food requirements of the country and thereby increasing the income of the farming communities. Thus the ultimate goal is to help the farmers by way of education and training to adopt the latest agricultural innovations for better production and thereby richer living. The agricultural universities as a principle, do not confine their activities within their four-walls; rather, the Directorates of Extension Education of the universities are fully devoted to non-formal education in agriculture. The integrated functioning of teaching, research and extension education in the agricultural university system makes it almost imperative for all the staff and students to support non-formal education, directly or indirectly.

The Directorates of Extension Education have adequate staff trained in agricultural extension and in particular subjects to devote full-time attention to non-formal education. In addition, other staff members of the university are involved, on occasion, in non-formal education programmes, to a larger or lesser extent, depending upon the requirements of the specific projects or activities. To support the Directorate of Extension, there are Departments of Extension Education, Agricultural Extension and Veterinary Extension in the constituent colleges of the universities, with adequate teaching, training and field staff. The Regional Research Stations/Sub-Centres of the agricultural universities which earlier concentrated on research activities alone are now developing facilities for supporting teaching as well as extension education and non-formal programmes.

The organizational pattern for non-formal education varies from university to university in the respective states. For example, the Punjab Agricultural University (PAU), in order to give technical support to the extension staff of the state departments has provided seven to eight subject-matter specialists in different fields of specialization at each District Headquarters; thus the subject-matter specialists of the university and the district level extension staff of the state government have been working hand in hand to support non-formal educational programmes in agriculture in the respective districts. In Haryana, the Haryana Agricultural University (HAU) has established *Krishi Gyan Kendras* at each District Headquarters, with a building of their own with adequate laboratory facilities and subject-matter specialists to work with the district level extension staff of the state to organize non-formal education for the farmers directly in the villages. The provision of subject-matter support at each district level in the state has also been recommended by the National Commission on Agriculture. Nevertheless, in view

of the heavy investment, many universities have not been in a position to provide subject-matter specialists' support on such a large scale. But each of them has at the main campus and also at the college level adopted either district(s) or a number of selected villages for extension education programmes and activities. The universities do have a mechanism to interact at the state and district levels and, on occasion, even at the Block or village level to support non-formal education programmes for the farmers.

The Directorate of Extension and departments in the colleges have been undertaking numerous extension activities for the educational benefit of the farmers. Extension training is one of the very important activities of the Directorate. These trainings are of two types, broadly speaking: (a) training for the in-service staff of the State Department of Agriculture who are involved in a non-formal education programme in their respective fields of specializations; and (b) training of farmers on the campus and through mobile teams. The Punjab Agricultural University and Haryana Agricultural University both have established training schools to organize regular training for the farmers. The courses range from a few days training to six months depending upon the needs of the farmers. Farmers are provided stipends for undergoing such training programmes so that they may not have to bear financial burdens during the training period. In the selected districts and villages the extension staff of the university with due support from the academic departments has been providing advisory services and information support through publications, radio and television to keep the farmers abreast of the latest in agriculture. In each *Kharif* and *Rabi* season a number of results and method demonstrations are conducted by the university staff. To strengthen the non-formal education facilities of the universities, the ICAR has started supporting financially the development of Communication Centres as a part of the Directorates of Extension. An Advanced Centre of Communication is also being established with the assistance of the UNDP and the ICAR in one of the agricultural universities, which will be the main centre to train communication personnel of the universities, the state departments of agriculture and such other agencies.

Youth development education

Orienting rural youth to scientific innovations is a basic goal of any extension system. The history of the 4-H Clubs and Future Farmers of America (FFA) are startling examples of how the younger generation, both boys and girls, can be trained and motivated to accept modern technology. This concept of youth organization has spread in many developed and developing countries. While youth clubs have done much good in developed countries, the developing ones could not make much headway in mobilizing, organizing and chanelling their youth's potential for development. In most of the developing countries, unlike developed ones, almost 40 per cent of the population are youth in the age range of about 12-30 years. The building of these young minds for the future is the most crucial component of any development scheme. But unfortunately, this is one of the most neglected areas in our development efforts as Table 1 illustrates. This would continue to weaken our extension work, for youths are the future farmers; initial investment in them would reduce outlays on extension and adult education programmes.

Table 1. Youth work achievements

	Boys youth clubs		*Girls youth clubs*	
	1960-61	*1970-71*	*1960-61*	*1970-71*
1. No. of CD blocks reporting	2,448	4,200	2,448	4,200
2. Youth clubs functioning	52,200	96,300	20,000	54,600
3. Average clubs/mandals per CD block	21	23	8	13
4. Membership per club	19	22	–	–
5. Index of achievement per block (base 1960-61 = 100)	100	110	100	159

Involvement of women

Women by tradition have not been involved in the main stream of development in developing countries, and they have also not been prepared (for no fault of theirs) to take an active part in development activities. This unfortunate legacy must be changed, for the involvement of women in everyday life and living is, in fact, more than 50 per cent. In rural areas their participation in household work and in the management of farms is much more than men folk's, especially in small farms, poor families, and hill and tribal regions. There has been a recent awakening to this situation; the process has to be hastened in order to use the latent talents of women in accelerating the pace of development.

"When you teach a man, you teach an individual; but when you teach a woman, you teach the whole family". This is an accepted adage. In any development scheme one has to reach the women, but men being by and large the decision-makers in the family, women get virtually no chance to evaluate alternative innovations and choose from them. This affects their acceptance and wholehearted support and adoption. Experts in nutrition and home economics complain that there is no point in teaching house-wives about food and nutrition, for when it comes to decisions and action males dominate. They recommend training first the males before such courses are offered to women. But studies have also shown that in new and nuclear families, decisions in the family are more influenced by wives than husbands. As to women's communication ability, one knows by common observation that they are quite capable. Their talkative nature, friendly chats, informal discussion, and gossip can be usefully utilized if they are properly oriented with appropriate messages. In this regard, Dutt says, "it is like throwing a stone into the calm water of a pond, the ripples start and spread reaching the far end of the water. A single village woman properly initiated in a subject can do tremendous good through communication of her knowledge; from person to person it goes a long way".[13] These facts must be utilized by the extension workers.

When the CD Programme started (1952), women's extension activities focused on home economics. Each CD Block was provided with two *Gram Sevika* and one *Mukhya Sevika* (lady village level workers). On launching the Applied Nutrition Programme (NAP), three additional *Gram Sevika* were provided in ANP Blocks. In 1971, there were 6,958 positions for *Gram Sivaka* and 2,269 for *Mukhya Sevika*, of which only 10.5 and

12.3 per cent respectively were not filled. Women's extension work suffered a set back when these positions were abolished later in some states: Jammu and Kashmir, Negaland, Rajasthan, Amnachal Pradesh, Bihar, Gujarat, and Laccadives.

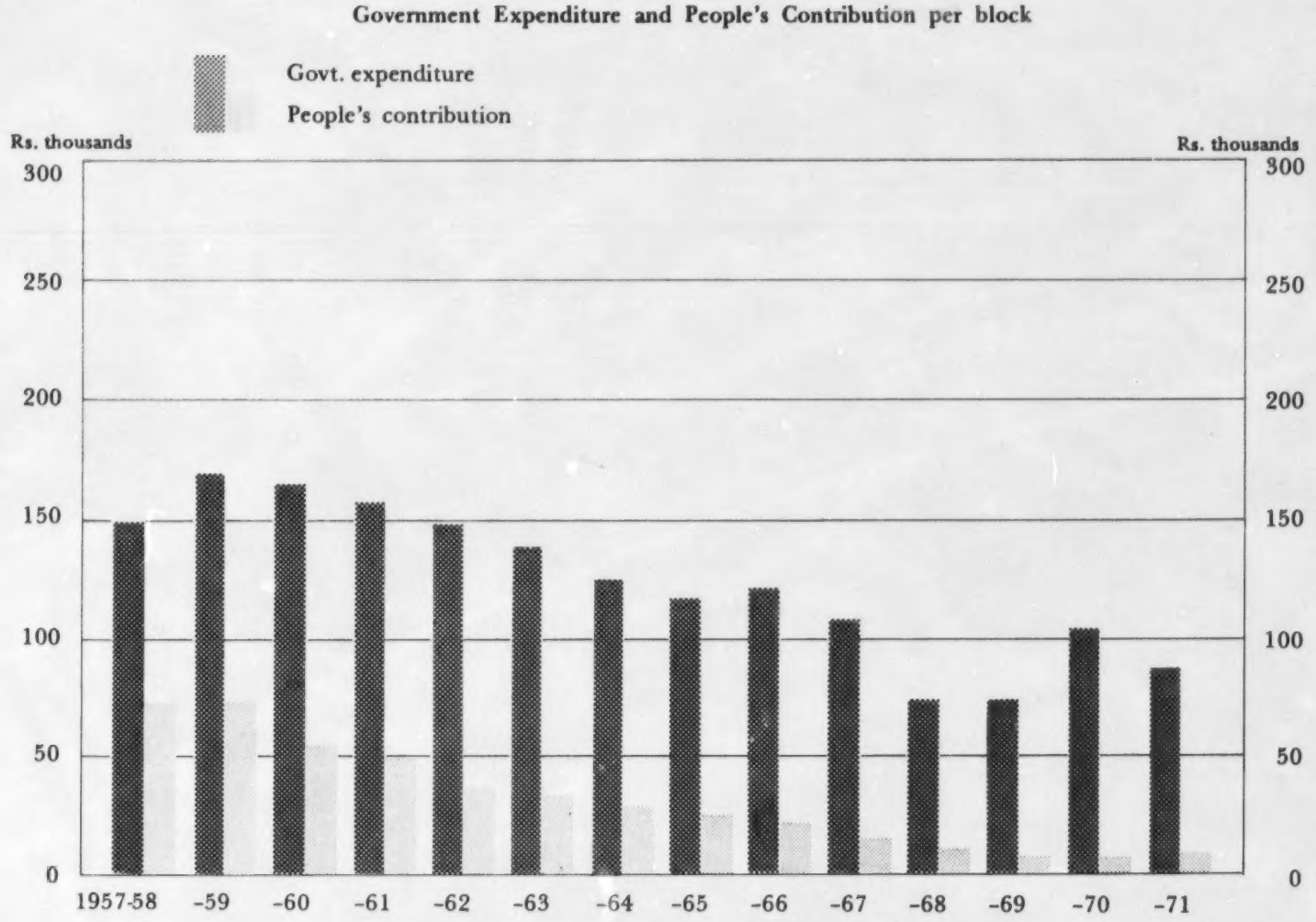
Until recently women were mainly associated with food and nutriton work, family planning, and child welfare; their extent of participatoin in agriculture and related areas was not realized. Their involvement, as is now known, in certain agricultural and animal husbandry operations is substantial. In hill-regions in India they carry out almost 90 per cent of agricultural operations including marketing. This fact has now been realized and attention is being paid in the Indian extension system to strengthen this component of rural development. Now we have eight home science colleges as an integral part of the agricultural universities, for rural oriented training to would-be home economists; other agricultural universities are following suit. The *Gram Sevika* Training Centres prepare *Gram Sevika* for village work with rural women.

Community participation and voluntary organizations

At the inception of the CD movement, it was pronounced that it would be a people's programme with government guidance, technical support and assistance. The people's participation was expected in many forms – donations of money or labour, acceptance of new programmes and their popularization among neighbours, raising of community nurseries, organizing and supporting organizations for youth, adult and women's programmes, the running of libraries and literacy classes, sharing of seeds and planting materials, organizing community efforts for solving common problems, and so on. This participation was good to start with, but gradually it has slackened instead of gaining momentum. For instance, the government's total expenditure on CD programmes between 1951-52 and 1970-71 was on the order of Rs. 6,304.9 million, and the people's contribution for the same period was Rs. 1,595.5 million – about 25 per cent of the total. However, the Bar chart-1 indicates erosion of this value; in 1970-71 the people's contribution was of the order of Rs. 218.6 thousand only in comparison to Rs. 7,730 thousand in 1965-66. This is indeed alarming for professionals in extension as well as others who are interested in seeing the CD movement grow and become a people's programme.

Eliciting people's participation in CD work has not been an easy job. During the Second Five Year Plan, concern was expressed to this effect and a need for speedy development of rural institutions was felt, to encourage more public involvement. "Government is the best which governs the least" says Mr. S.K. Dey.[15]

In 1957, the Balantray Mehta Team was appointed to study, among other things, "the extent to which the CD movement has succeeded in local initiatives to ensure continuity in the process of improving economic and social conditions in rural areas." The team recommended an early establishment of statutory elective local bodies –*Panchayati Raj* Institutions (Village *Panchayats, Panchayat Samitis* at CD Block level, and *Zila Parishad* at District level) and devolution to them of necessary resources, power and authority. Today, 90 per cent of our rural population is covered by village *Panchayats*, 4,974 CD Blocks have 4,033 Panchayat Samitis, and out of 395 districts, 262 Zila Parishad.


Government Expenditure and People's Contribution per block
Govt. expenditure
People's contribution
Rs. thousands
Rs. thousands
300
250
200
150
100
50
0
1957-58
-59
-60
-61
-62
-63
-64
-65
-66
-67
-68
-69
-70
-71

There are different opinions as to the gains of decentralized democracy by way of the *Panchayati Raj* system. Nevertheless, the "Report of the Committee on *Panchayati Raj* Institutions" while summing up its vitality has said,

> It has many achievements to its credit . . . . Politically speaking, it became a process of democratic seed-drilling in the Indian soil, making an average citizen more conscious of his rights than before. Administratively speaking, it bridged the gulf between the bureaucratic elite and the people. Socio-culturally speaking, it generated a new leadership which was not merely relatively young in age but also modernistic, and pre-social change in outlook. Finally, looked at from the development angle, it helped rural people cultivate a developmental psyche.[16]

Present day agriculture requires a lot of co-operative efforts on the part of villagers. For example, the burning of all sugarcane trash after the harvest can avoid the infestation of *Pyrilla*, control rodents and other pests and diseases; aerial spraying for crop protection or fertilizer application, developing community nurseries for paddy, vegetables and horticultural crops, running of co-operatives – all these need community participation and unity. The community participation described by Chester Ronning after his visit to China (1971) should interest us in this regard:

> As darkness descended upon the rice paddies, the countryside was so flat that it seemed to blur into one vast, limitless paddy. All of a sudden, the earth rather than the sky above assumed the appearance of the Milky Way. Myriads of tiny lights dotted the countryside. "What is the meaning of all these lights?" I asked the chauffeur. He explained that when the rice heads are in the pollenization period, tiny insects destroy the whole rice crop. He stopped the car and showed us the tub of water directly below a light. When the insect pests arrive at dusk, they are attracted by the light, fly into it, and fall into the water below. We saw peasants coming out with tubs, pails, basins and every household article that could hold water. Above each receptable a light was lit – candle, an old lamp, or a burning cattail soaked in oil, direct current electric light bulbs attached to the battery circuit, and even neon lights. The villages were dark. Every available light was out to save the rice crop.[17]

Some broad lessons

This paper is mainly based on the Indian experience in integrated rural development. Since agricultural and allied areas are the major ingredients of rural development, they have been the basic focus of this paper. While the treatment of the paper includes experience as well as implied suggestions, some broad emerging lessons are highlighted here.

1. Rural development has to be recognized by both developing and developed nations as a massive task and a continuing phenomenon. Based on the stages of development in a particular country, investment and priorities may change. The task of rural development is an intricate subject. This perception must prevail in order to attract maximum attention from government and non-government organizations as well as the public at large.

2. The concept of "helping people to help themselves" has been accepted and well documented, but people's participation in rural development has yet to be fully realized; there has been more individual participation for economic gains than community participation for common development.

3. The subject of rural development being a baffling one, many approaches to development have to be reckoned with. Different rural development designs have been followed in different countries to suit the local needs and conditions. This is imperative. The success or the failure of the rural development programme in any country has been closely associated with the commitment of the professionals.

4. Rural development has been conceived as all-inclusive in nature; all rural problems being inter-related, they must be tackled simultaneously. In the absence of such an approach, extremes have been practised in some countries – focus on only agricultural development, on only health services, and the like. Nevertheless, rural development programmes must give the highest priority to economic areas especially in the initial phases of development.

5. Development of the rural community is a subject which must interest all alike. All educational, research and development institutions must participate in it, to a greater or lesser extent, depending upon their resources and priorities. In other words, the concept of integrated functioning of instruction, research and extension has to be accepted, not only in professional and technological oriented institutions, but in general institutions as well. Involvement of institutions in development will enrich their programmes by making them more relevant to the needs of the communities.

6. There has been compartmentalization in the field of agricultural education, especially in the context of agricultural education in the school system, intermediate level education in agriculture, and higher agricultural education. Functional relationships and support to each other are important for making an ultimate dent in agricultural production. The educational continuum concept in agriculture has to be given cognizance. Agricultural education in the schools and at intermediate level has suffered in comparison to higher education in agriculture. To compensate for this loss, added attention and investments are necessary to strengthen agricultural education in the school system, technician level education in agriculture, and vocational training for farmers, farm women, and fishermen.

7. Development schemes must cater to the needs of various kinds of people. Therefore, varieties of projects and activities have to be launched to meet varied local needs. Special programmes are essential, particularly for the poorest of the poor, weaker sections of society, and small and marginal farmers.

8. Development of rural areas is related to the establishment of development oriented institutions such as extension organizations, training institutions, and research establishments. The density of such institutions proportionate to the area and population is important for the rapid transfer of rural technologies to generate more employment and income.

9. Professionalization in rural development must be brought about. There are various categories of extension workers, researchers, and subject-matter-specialists in

agriculture as well as in the social sciences who are or should be suitably involved in rural development programmes. The applied nature of extension education must be maintained, in order to produce field-oriented extension agents. The training of extension personnel must maintain the proper balance between technology and pedagogy.

10. Non-formal education has a relatively short history in comparison to formal schooling; the latter therefore is given importance by all concerned, but not the former. Non-formal education should occupy a similar position to school education. The distinction between education and training has to be more categorically defined and introduced in the educational and training institutions, in order to make the latter more skill-oriented. Modern technologies are relatively sophisticated and capital intensive. Skill training for producers will give them the confidence to accept modern technologies.

11. Rural development efforts in developed countries have established that youth development education both for boys and girls, as well as equal involvement of women in all sectors of development, are imperative. This realization of this fact is still limited in developing nations. These areas should be in the priority list of development programmes.

12. The contributions and commitments of many voluntary organizations are well known. In order to enlarge their programmes for greater services to rural people, governments must support and recognize them. Such organizations have a legacy of values and dedication to rural development which should be tapped for orienting and training extension agents.

13. To accelerate the pace of rural development in developing countries, the developed nations must share their experiences and support the developing ones by means of human and material resources, without reservations. The role of international agencies like FAO, Unesco, UNDP, and Unicef becomes very crucial in this respect.

14. In the initial phases of rural development, where illiteracy is high and communications net-works poor, multi-purpose Village Level Workers (VLWs) living in villages have been found useful. Nevertheless, as development progresses, specialized extension agents are required to handle advanced technologies.

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14. *A set of self-learning and instructional modules in science*
15. *Science for all; report of a Planning Group Meeting. 1982*

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* Out of stock

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Each country has set up a National Development Group (NDG) to identify and support educational innovations for development within the country and facilitate exchange between countries.

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5. Education and urban development;
6. Educational technology with stress on mass media and low-cost instructional materials;
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